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A rare coloured satirical engraving of John Nash, drawn by Seymour, engraved by Shortshanks, recently purchased by the library. The smaller reproduction is of another and better known engraving of Nash in the library

The subjects of the many allusions in the Great Joss engraving are clear but the reason for the giraffe and Burton's Hyde Park colonnade need explanation

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Journal

THE BUILDING INDUSTRY

The meeting on Monday, 21 November, was undoubtedly one of the most useful there has been at the R.I.B.A. for a long time, and in one way it was an historical occasion, because surprising as it may seem, never before in the whole history of the R.I.B.A. has there been a sessional paper and an open discussion on the building industry. This omission may, of course, be apologised for by saying that the need for such a paper is new, that never until now was the building industry sufficiently a unit to justify debate on it as such, and this could be backed up by the remark that it is largely action which has originated within the Institute that has helped to bring the industry to such a state of recognisable identity that its affairs could be discussed.

The fact remains that Mr. Roskill's paper marked a turning point; a regular Cape Horn of turning points. The meeting opened by the speaker wondering whether he was to escape alive and ended by him wondering how he had managed to do so. Never perhaps has so much barely veiled bitterness and sarcastic comment been introduced into a discussion here. Every one of the contributors to the discussion seemed to resent some part of Mr. Roskill's vigorous objective commentary and were engagingly frank in meeting his arguments or seizing on the points which he presented.

It was a peculiar evening and perhaps it would have been well if some preliminary explanation had been made of Mr. Roskill's viewpoint and the purposes behind the meeting and in particular the purpose to be achieved by the bold gesture of getting a commentator and critic from outside the industry. It is, of course, well known that there are many experts within the industry who have served on various committees and councils which have concerned themselves with some or potentially with all aspects of the industry, but every one of these possible commentators would, in fact, bring with him a justifiable bias towards his own special side of the industry, or, putting it in a phrase less easy to misinterpret, would be too close

to some parts to get perspective. What we wanted and got was someone who stands in relation to the industry as a whole in a similar position to that held by an architect in relation to the subject for which he is about to plan. Neither the cook, the gardener, the nurse nor the mistress, not even the householder himself, can claim the requisite detachment from the problem of their particular household needs to obtain the architect's view of the balance of requirements. Mr. Roskill as an industrial consultant is a person trained to view industries objectively and that in fact is the view he gave.

The ultimate results of a meeting such as this cannot easily be calculated. From the superficial evidence of the vigorous expressions of opinion which the paper provoked little can be deduced, but from a close analysis of the totality of evidence provided by the criticism and opposition, the states of mind represented, the conservatism or progressiveness of the parties to the discussion a general view of the "personality" of the industry can be obtained which will be of great value to future students.

The urgent necessity for consideration and reconsideration of the Industry is brought out in an introductory leaflet issued with the current issue of the *Building Industry Survey*, published by B.I.N.C., in which it is said that "For the first time since the slump of 1931-33 the Building Industry is facing a decline in trade, and in view of the lessons we have learnt, it is obvious that we must look to our equipment in order to be sure that it is ready to meet the tasks which lie before it." The weakness of the discussion at the meeting was the thread of self-satisfaction that ran through it, a sort of "don't-you-worry-we've-got-the-whole-matter-in-hand" attitude, which is a very impotent poor armament with which to meet slump conditions. It may include much very excellent self-confidence, but may no less include a dangerous amount of complacency.

"QUESTIONS AND ANSWERS"

A very important issue of *Questions and Answers*, dealing with the thermal insulation of buildings, is included with this JOURNAL. Regularly we receive

requests from members to supply them with past copies of *Questions and Answers* to replace those they have been given free with their JOURNALS and have wantonly (what other word can be used?) thrown away. Some months or weeks afterwards it dawns on them or is forcibly brought home to them that they need the information given in a particular note. It is then that they are sometimes rather distressed to find that the note is out of print or that if copies are available they are expected to pay for them. These foolish virgins of the profession may be in a small minority—at any rate they exist, so, for them in particular, **the note in this JOURNAL is worth keeping.**

During recent years *Questions and Answers* has been distributed as an inset to the JOURNAL to all the JOURNAL's recipients—distribution on a prodigal scale which can only be justified if the notes are really used. Included in this distribution are all the Institute's students and a large number of public libraries and clubs. It has been decided not to send *Questions and Answers* in future to these two classes of JOURNAL recipients, but copies of single issues can be obtained at 6d. each and of the complete year's issue for a subscription of 5s. (post free).

STATE CONTROL OF PLANNING

The Ministry of Health covers such an enormous field of national activity that its complete annual report is for any specialist reader more than half-filled with reports on subjects which do not concern him. To meet sectional interests the Ministry wisely publishes extracts: that dealing with the town and country planning activities of the Ministry has just been published, and can be obtained from H.M.S.O. for 9d., plus postage.

The report starts with general appreciation of the progress made in the preparation and approval of schemes. Ninety-six schemes were submitted, as compared with 76 in 1936-37 and 21 in 1935-36, and another 158 have been adopted locally, but not yet submitted. Thirty-one schemes were approved as compared with 16 in 1936-37 and 8 in 1935-36, a very significant improvement on which the Ministry can be congratulated in so far as it represents a speeding-up of work inside the Ministry. Nearly two-thirds of the total acreage of England and Wales is now "under planning control," a phrase that means that powers of control exist, but are not always used with the determination intended.

An important section of the report deals with the preservation of the countryside; the three types of rural zoning methods adopted, namely, low-density zoning, temporary restriction of general development and a loose agricultural zoning, are not now considered entirely adequate to preserve a completely rural area

which should retain its character indefinitely. On the South Downs effective agreements have been made with landowners who have undertaken in most cases to preserve their land from building or to restrict building to carefully defined densities, but such agreements cannot always be obtained, and the Ministry suggests, in conformity with the proposals already made by the Town and Country Planning Advisory Committee, that in such zones the only buildings to be allowed freely are those for agriculture, horticulture, forestry, rural industry on a small scale and the winning of minerals; and dwelling-houses for the persons employed in agriculture, horticulture or forestry. The need for exceptions would have to be proved. This naturally leads to another matter of obvious importance to architects, the general character of the buildings architecturally. It is all very well to talk in theory of the permanent preservation of rural character by restricting development to say horticulture, but there is probably no rural industry, unless it is chicken farming, whose buildings can be so aggressively ugly. Several suggestions are made relevant to this apart from a general blessing of the Panel system and a repetition of the Minister's emphasis of "the importance of skilled advice." There seems in the whole of this paragraph to be a curious reluctance to use the word "architect": "skilled advice" can mean anything or nothing.

In the part of the report dealing with urban planning there is an interesting discussion of height restrictions in which full weight is given to matters of appearance. It is proposed that restriction based on existing heights is on the whole better than restriction by angular measurements. Density of flats and the proportion of bedroom space as a means of calculating the probable population is discussed. The report ends with short descriptions of a number of typical cases in which the Ministry exercised its authority.



A photograph taken by Mr. Gordon Lee of the concert on Friday, 25 November. (See page 132)

The chief characteristic of the building materials section of the industry is the

What is the position of the builder and contractor? To take a simple

What is the position of the building owner in relation to the industry as a whole?

Take the architect. He is in an impossible position. I do not believe it is humanly possible

ECONOMICS OF THE BUILDING INDUSTRY ACHIEVEMENTS AND ANOMALIES

By OLIVER W. ROSKILL

1. INTRODUCTION

I should like first of all to thank you very much indeed for the honour which you have done me in asking me to read this paper. I express my thanks at the beginning because I have an unhappy feeling that our relations may be more strained after you have heard what I have to say! I submitted the draft of my paper to two friends. One of them told me that he thought the audience would certainly be nearly asleep before I got half-way through, and the other said I should be very lucky if I got out of here alive! There seemed to me to be a certain incompatibility in their views, but in any case I appreciate very much the honour of being asked to address you.

I would rather face the charge of ignorance than of prejudice. Moreover, I think it is increasingly important in these days of specialisation that some attempts should be made to view groups of related activities as a whole and to trace their interconnections. Nowhere does this seem more important or more difficult than in the case of the building industry and the professional activities

attached to it. My everyday work brings me into contact with many aspects—with the building material manufacturer who wants to put a new product on the market or to conduct a market survey; with the building firm which is in trouble with its internal organisation or wants to know whether to turn to speculative work when contract work is short; and with the architect himself. But I know how difficult it is to view the industry as a whole, and, as I say, while I know I shall, as an outsider, be charged with ignorance, I hope you will believe me when I say that I am trying to take an unprejudiced view.

2. THE PARTNERS IN THE INDUSTRY

The relationship between the three principal partners in the building industry has changed fundamentally in recent years. I refer to the building materials manufacturers who make the raw materials, the architect who designs and plans the finished product and the builder and contractor who conducts the assembly. I have deliberately put in a secondary position the building owner who provides the finance or pays the bill and his account-

tant watchdog—the quantity surveyor. Finance should always be the hand-maid of industry and not, as it so often tends to be, its mistress. While the property company which is going to own and manage a block of flats or a private individual who is going to live in the house he is having built may naturally feel that they are entitled to a voice in what it is going to look like or how it is going to be planned, they should not do more than lay down general specifications in the initial stages. Interference in detail seldom proves to be in their interest.

The relationship between these partners—never a close one between them all—is changing because the basis of the building industry itself is changing from craft to applied science. It is a change which has taken place in most other industries—in fact building has lagged behind in this respect—but it is proving more difficult in the case of building because of the existence of five partners, all very independently minded, and because of the very large range of materials employed.

3. THE ARCHITECT

Take the architect. He is in an impossible position. I do not believe it is humanly possible for any individual to be responsible for design and aesthetics, which implies a deep sensitivity to environment and historical influences; for planning which implies a full knowledge of contemporary social customs and requirements, and in addition something of the background of motion study; for materials, which implies an absolutely vast knowledge of a score of different industries and a thousand different products ranging from asbestos to zinc; for engineering methods in fields as diverse as steel frame construction, air conditioning, and electrical wiring, and at the same time to be his own salesman and talk intelligently at dinner parties or shoot partridges with property owners. There are several minor points which I have left out such as developing sufficient strength of character to cope with recalcitrant builders. I have a very real respect for the architectural profession in which I have—and hope to retain—many friends; but I repeat, I do not think it can be done.

That many architects agree with this is implicit in several recent developments in the profession. It is, I fear, all too common for architects to get prospective sub-contractors to prepare for them various parts of the technical detail of their designs. An even more undesirable habit—which is at any rate sufficiently common for specialist sub-contractors to have to take steps to prevent it—is for

the architect to erase the name from the bottom of the drawings and get half a dozen firms to tender on their competitor's drawings. Architects would do well to bear this in mind when criticising some of the price rings which have recently become a commoner feature of the industry. Another result is that the sub-contractor who prepares the drawings is naturally going to see to it that the amount of his particular product or material—steel, for instance—isn't stinted.

Another development is for architects to rely increasingly for information on materials on the various organisations—co-operative or individual—who advertise them. No one would deny that the co-operative sales development organisations which have sprung up in such numbers in the post-War years are doing very fine work. I have assisted in setting up several of them and so have every reason to support them. Many employ scientific and technical men who hold strongly to the belief that the best form of sales promotion in the long run is to see that their material is used for the right purpose rather than for every possible purpose. But even so if an architect tends to rely for information on water services on the Copper Development Association, he will tend to use copper, and if he tends to rely on the Lead Industries Development Council, he will tend to use lead. He will neither have the time nor, probably, the technical knowledge to make an independent comparison of the relative merits of the two for the purpose in view. As a periodic user of that most valuable institution I should be ungrateful if I left this subject without a reference to the Building Centre, which has surely done pioneer work in helping to bring a practical knowledge of materials to the architect. But it is not every materials manufacturer who takes space there, and while I think there is a very high standard of impartiality of advice, the absent materials must sometimes tend to get forgotten.

In some cases architects with complementary qualifications form a group in partnership together, but this, I believe, has been comparatively rare, though I should have thought it one of the best ways of meeting the difficulty. In others architects tend to rely on quantity surveyors for a good deal of information on materials, but this is generally coupled with the necessity to reduce costs by the use of alternative materials or methods and therefore has the danger of leading to a rather negative approach. In any case the quantity surveyor is seldom in a position to suggest fundamental altera-

tions of the whole design, as the matter reaches him at too late a stage.

Cases in which the architect employs a specialist consultant—say in electrical wiring—are still comparatively rare, and I suggest that the fault lies mainly with the method of payment laid down by this Institute. Secondary causes are that while the nominal work of the architect has been enormously widened, it is very difficult for him to persuade the client of the need for additional expenditure on specialists; and in some cases he is unable to sacrifice part of his percentage on those sections of the work on which specialists are employed. One point on which there seems to be very little independent information and which might well be the subject of investigation by a body such as the Surveyors' Institution is whether the specialist can generally save his client the equivalent of his fee even under the existing system of payment. Many specialists claim strongly that they do so.

In any case, as long as the tenders of six specialist sub-contractors have to cover the cost of six sets of drawings which should really have been prepared by the architect or a specialist consultant, it is obvious that the fee which should be paid to the latter is hidden in the extra amount of the tender. It is from that source that savings would be made if the architect were in a position to make fuller use of specialised technical services.

I cannot leave the question of the ability of the architect to cover the whole range of knowledge of materials and methods without a passing reference to architectural education. Ideally knowledge of design, construction and materials should go together and it is impossible for the architect to separate the technical from the æsthetic. My question is not whether the architect is to remain responsible for the whole field—he must remain the co-ordinator—but whether he can do so without assistance, whether the mechanism to enable him to use such assistance is satisfactory and whether he is in close enough contact with his other partners in the building industry. Some schools of architecture are very much concerned with design in relation to current sociology and ideology: others—I believe the Aberdeen school in particular—with materials. I do not know who has been most to blame for the divorce of design from materials and construction. But while many modernists will tell you that they are developing the applications of a new material, such as reinforced concrete, in fact they are much more preoccupied with sociology

and ideology than with a study of new materials, and there is a danger of our architectural education propagating a formalised idea of what a modern house should look like.

There is one other related question on which I want to touch in connection with the position of the architect. Is he going to maintain much longer an independent professional status? Government departments, local authorities, property companies, the railways, chain stores and institutional building owners generally are accounting for a constantly increasing proportion of the total building activity of the country and most of them employ salaried architects. So do many of the biggest industrial concerns, and I know of several other cases where new factories are being built where the architect has been temporarily absorbed into the company concerned. The days of a Vanbrugh and unlimited demand for country houses on *carte blanche* terms are gone for ever, and I would even suggest that after excluding building on which no architect at all is employed, the proportion of the total building output of the country on which architects are employed on a strictly professional (as opposed to salaried) basis is comparatively small. At the same time, the salaries generally offered are comparatively low, which results in failure to attract the best men. I feel that this general trend is probably inevitable, but it is disquieting mainly in so far as an independent position is important from the point of view of design and æsthetics. There are a certain number of architectural practices which are mainly of a consultant type, and these may perhaps point the way to a solution of this particular problem. That is particularly important in view of the questions of design and æsthetics, which are not likely to get their full share of consideration where the salaried architect is concerned.

4. THE BUILDER AND CONTRACTOR

What is the position of the builder and contractor? To take a simile from engineering, if the architect designs the machine and the building materials industry supplies the raw materials and constituent parts, the builder is responsible for assembly. But it is assembly under conditions very different from those in an engineering shop. First there is the weather and all that that means. Secondly, the designer and the assembly engineer are on different sides of the fence and there is little co-operation between them on method. If the designer of a motor car, as may well happen, designs his mudguards so that pressed steel dies are awkward or expensive to make, the press department will

quickly let him know the fact and modifications will follow. If a new and cheaper method is devised for, say, shuttering concrete which requires modifications in design, the builder may know about it, the architect may not. To get it actually used is a matter of great difficulty. The builder is generally at his best on method when he is doing speculative work organised and planned by himself. Please don't mistake me: the houses may be the last word in ugliness, and may have no foundations and a leaky roof; but to see method at its best you have to go and watch the orderly development by one of the better builders of a speculative estate.

The form of contract is a fruitful source of trouble and one to which a great deal of thought is being devoted at the present time. I think there are two tendencies: one is towards combination by contractors to try to eliminate some of the more glaring anomalies of the competitive tendering system; the other towards an extension and adoption by other contractors of what is generally known as the Bovis system of "cost-plus" tenders, supervised by a quantity surveyor.

With regard to the former, building remains an open industry. It is practically impossible to start a new daily newspaper nowadays: it would be very difficult to start the manufacture of motor cars on a large scale or of certain chemicals; but every day a few employees of building firms break away and set up as jobbing builders or speculate a house or two and then try their hand at contracting by putting in a low price for some job which is going. A high proportion go bankrupt often before the job is finished, and it is undoubtedly in the interest of the building industry as a whole to stop this wastage while at the same time retaining freedom of entry to the industry. A further difficulty of the same kind arises from speculators who enter the industry with little knowledge of it and even less care for standards and service. It is fashionable at the present to talk of senseless price cutting. On the whole, I am strongly in favour of senseless price cutting, provided: (a) that the consumer gets his goods cheaper without loss of quality and (b) that it does not react against the efficiency of organisation and technical progress of the industry as a whole. In the case of building very often neither of those conditions is fulfilled; the consumer may think he is getting his goods cheaper, but he may not get them at all if the contractor goes bankrupt in the middle. I don't say that this is very widespread, but it is sufficiently

common to merit consideration. And in any case if the contractor has to put in too low a tender there is an enormous temptation for him to scamp the job which the combined efforts of the architect and quantity surveyor may fail to prevent. I cannot over-emphasise my conviction that unless the relations of the several partners in the building industry are directed towards co-operation in producing the best possible job at the lowest possible price commensurate with a reasonable return to all of them, rather than having the relations of smuggler with Customs officers, progress is going to be very difficult.

As to the efficiency and technical progress of the industry as a whole, these are very elusive factors. I supported the price fixing scheme in the spinning section of the cotton industry on the grounds that price cutting in a shrinking market was not stimulating consumption and that unless the spinners could at least cover their depreciation charges there was no prospect of effecting the technical re-equipment which is so urgently necessary. Is the stimulus of intense competition the right stimulus for effecting technical progress in the building industry, particularly in the field of building methods? Many new methods demand investment in new plant and require practical research and development work.

If provision is made for eliminating excessive price cutting can it be linked with a drive for technical progress? These are questions which I should hesitate to answer. I do not propose to deal in detail with the London Builders' Conference, which is the latest of the builders' price control schemes. It has been described recently in great detail by Sir Alfred Hurst in the *Builder*, and I do at any rate herald it as a great advance that its objects and methods should be subjected to the full light of public scrutiny in the industry. It is worth adding that there have been many other local price rings of contractors, though most of them on a rather different basis. There was one in one of the big North Country towns a few years ago—I don't know if it is still in existence. Five tenders, all within a few hundred pounds, were received for a very big job which went to the sixth tenderer, who was ten thousand pounds lower. A week after acceptance he came round, hat in hand, with a piteous story of a clerical error.

Apart from the chequered history of the fundamentally different "cost-plus" system, I believe the origin of the Bovis system lay with the require-

ments of a building owner carrying out a succession of similar jobs in which the need for speed and experience in the particular type of work concerned pointed strongly in the direction of choosing one builder and sticking to him. It is possible that if each job were put out to tender, there would be an appreciable saving on the price paid for, say, 100 jobs. But, the argument runs, this apparent cash saving would be more than counterbalanced by lack of speed and continuity, by dislocation in dealing with many different builders, and by loss of the advantage of bulk purchase of standard materials. I think the argument is justified provided always that the check provided by the independent quantity surveyor is faithfully adhered to. The system is, I believe, spreading to individual jobs, and here, while there remain certain arguments in its favour, there is the danger that it may be used by contractors as a means of selling their services over the lunch table. The tendency towards tendering by invitation is already a strong one and has much to commend it where the building owner, architect or quantity surveyor has knowledge or experience of the efficiency and integrity of any half a dozen firms. But it does introduce a new feature of salesmanship into contracting and, if carried to excess, the personality and entertainments allocation of the managing director may tend to become more important than the figure put forward with the tender. Where the Bovis system is used on individual jobs this argument becomes greatly reinforced. In one interview, the contractor may be able to sell his services and cut out his competitors.

A great many of the troubles associated with the traditional open tender system could be eliminated if the architect took the proverb "more haste, less speed" nearer his heart. Even with the most expensive sites there is little doubt that speed is allowed to assume a disproportionate importance. The building owner wishes to see some practical signs of activity, and the architect is too inclined to be frightened of standing up to him. I feel sure that in many cases it would be possible to convince the building owner that it is possible to make substantial savings by planning the job thoroughly right from the start and avoiding extras and disorganisation later. Interest on the value of the site is not the only factor. The building owner wants to let his flats, trade in his shop or start production in his factory as quickly as possible. But I think it should be possible to achieve at least the same speed of building as well as reducing

the cost if instead of the architect producing rough plans which are then used as a basis for tendering he were to produce half-inch detailed drawings right at the beginning on which proper bills of quantity could be prepared. In the same way, vague p.c. items should be kept to a minimum. Here again, just as in the case of the employment of specialists, I think it is partly a question of method of remuneration as laid down in the profession. The architect gets out rough plans because he often does not know definitely if the job will be proceeded with or if he will get it. Many of the troubles of aircraft production in the rearmament programme have been due to alterations in design made in the course of production. And in this case also it is a matter which fundamentally affects the method of contract under which the machines are produced.

I have not said very much specifically about labour because I am treating capital and labour as partners in the building and contracting section of the industry. On the whole, labour relations in the industry have fortunately been very good. This can be attributed partly to the excellent conciliation machinery, second to none except perhaps the engineering industry; partly to the carefully thought-out grading and zoning arrangements and partly to the fortuitous circumstance that building has to meet no export competition. But I do feel that organised labour, without prejudice to its long-term interests, could play a much more active part in promoting the improvement in building methods and the reduction of building costs. There are many parts of the country which would benefit greatly by the greater use of building blocks of one kind or another. But is it a mason's job or a bricklayer's? Labour difficulties, actual or possible, have had a substantial influence on the introduction of new materials. The same applies to methods. Experts in labour organisation are not always welcomed with open arms in engineering shops. The sight of a stop watch on a building job will almost certainly mean a strike. I am not suggesting that there is not much to be said from the labour point of view; but I would like to see some initiative on the matter of improved method come from labour. It would be a big feather in the cap of the unions if they would undertake a practical study of the possibilities. The demand for building generally—houses in particular, but even new factories and churches—is amazingly elastic, by which I mean sensitive even to small changes

in the price of the finished product. The building materials industries, as I shall presently show, can make the biggest contribution in this direction, but I believe that if by improved method a saving of say 10 per cent. could be made on the price of the finished article there would be a sensible increase in demand—more than sufficient to reabsorb any labour displaced. There is also some case for believing that the unions have been too strict in limiting entry to the skilled trades and opposing any tendency towards dilution. Quite recently, even after activity had fallen from its peak, there were cases of building jobs held up for lack of skilled labour. Even if there was no shortage in the country as a whole—and I am not altogether convinced that there was not—if skilled labour is not sufficiently mobile to meet local shortage, the problem of labour shortage might be considered more from a regional point of view.

5. THE BUILDING MATERIALS MANUFACTURER

The chief characteristic of the building materials section of the industry is the enormous number of products which it includes—most of them separate industries in themselves. Some supply an appreciable part of their output to consumers outside the building industry, but when one considers that bricks, tiles, cement, glass and timber will barely build the shell of a house, some perspective is obtained. A few years ago structural steel was of very small importance to the steel industry and concrete tiles and sand-lime bricks did not exist. It is worth while remarking in passing for those interested in the location of industry what a high proportion of the building materials industries are "extractive" industries. Building is required everywhere where there is population, but gypsum for plaster, clay for bricks and tiles, marl and limestone for cement, stone for facing and slates for roofing—these are all tied to a limited number of localities. This, of course, is the chief reason for the wide differences in materials traditionally used in different parts of the country.

If building itself remains somewhat behind other industries in technique and organisation, not so the building materials industries. Most of those which I have mentioned above are large-scale industries, highly organised and, for the greater part, technically efficient. There may be faggot-fired kilns still in Sussex but there are tunnel kilns at Stewartby. It is worth remarking that the change from craft to scientific technique has in many cases

not had a very happy effect on the æsthetic side of the building materials industries and sometimes also on the durability of building materials. If the architect does not know all he might about materials, the materials manufacturer is generally out of touch with the taste of the architect. I know that the more far-sighted of them have recently come to recognise this. You have your rustic flettons, but for a nice, rather overburnt purple you may have to go to a small yard in Hampshire, where you will find tradition, but not technical efficiency.

The prices of most building materials are very closely controlled. Until quite recently there was a price-fixing scheme in the cement industry, and even now the Associated company and its group account for such a big proportion of the total output that they are bound to have a commanding influence on prices. The London Brick Company occupies a similar position with regard to flettons, and there are more or less informal price arrangements between the smaller facing brick producers in many different areas. One group controls a very high proportion of the total plaster output. Steel prices are controlled by the British Iron and Steel Federation. The White Lead Convention controls the price of lead paints. Pilkingtons and Chance Bros. occupy a commanding position in the glass industry as far as sheet and plate are concerned. Nearly all the metal casement manufacturers adhere to a price agreement. Lead pipe and sheet, copper tubes, cables—it is certainly a formidable array of controlled prices.

While I haven't a childlike confidence in the disinterestedness of the British industrialist, and while I could mention several rings which I should like to see broken, I am not one of those who believes—perhaps because I work for quite a number of them—that every trade association is a Gomorrah and every fixed price a step towards economic damnation. The London Brick Company reduced the price of flettons at a time when they were arriving almost hot on the site. There is developing a certain vogue in policies of reducing prices to stimulate consumption and this at least appears to have proved one of the cases in which the much-abused economist is right. But can we rely on the vogue spreading? Is it enough? While I believe that the large-scale organisation of industry is bringing a sense of responsibility and public service to which even the interest of shareholders is sometimes taking second place, I am doubtful. I think the materials manufacturers have had things too

much their own way on the matter of price. I am not blaming them. I think they are more efficient than the building and contracting section of the industry. Unless they combine together for a definite price policy they have little guarantee that any reduction they make in price—particularly in the case of the less important building materials—will ever get through to the consumer, and, thus, affect their turnover. But couldn't they combine to evolve such a policy in conjunction with the building and contracting section of the industry? Here would be a line of thought worthy of the name Building Industries National Council. The motor manufacturers are complaining that steel is too costly. They have found how elastic is the market for cars and whatever the merits of the case they are big enough consumers to make their voice felt. I am convinced that the market for building—not only houses—is even more sensitive to price.

There are, too, other aspects of the building materials section on which I should like to touch. It is much too difficult to introduce a new building material. I am quite aware of the arguments against rushing into the use of untried materials in building which has got to stand the test of years. But much modern building is not standing the test of years in any case—you have only to walk round a five-year-old speculative estate to see that—so that a slightly more experimental spirit might be justified. Speculative builders are rather ovine in the matter—if one can be persuaded to try a new material, the others will follow if it proves cheaper. But as far as the architect is concerned, even the most intelligent traveller selling a new product of genuine interest finds it a matter of extraordinary difficulty to get inside a busy office, and I do not think the firm developing new products should have to face such a terrific inertia, or what the Americans call sales resistance. It is not a question of the product being untested, even with a B.R.S. test behind him the manufacturer is faced with an uphill fight. I am not at the moment trying to suggest a remedy—I merely draw your attention to what I believe to be a serious trouble the roots of which are probably very deep.

This leads me to my second point—that in certain sections of the building materials industry there is room for improvement in selling methods. I hesitate to mention any individual section, but I think the remark may be directed more to those products whose sale is determined by builders themselves rather than by architects. Surely the

industry has progressed beyond the point where it is necessary to offer planks, trestles, brushes and ladders to purchasers of paint, according to the quantities taken, and I hope we shall never see the cement industry enclosing a Shakespeare in every sack.

6. THE BUILDING OWNER IN RELATION TO THE INDUSTRY

What is the position of the building owner in relation to the industry as a whole?

At the present time, the trend is for an increasing proportion of the total output of the building and contracting industry to be carried out on behalf of public bodies. Official policy has been to aim at taking up the slack caused by the decline in private enterprise speculative housing by pushing forward energetically with the local authorities' work on slum clearance and the abatement of overcrowding. Though much remains to be done and though the programme itself may be greatly expanded if standards of overcrowding are tightened up, this work has met with a good deal of success. On top of it has come very heavy building expenditure under the rearmament programme on Army, Navy and Air Force establishments; the prospect of intensified work on A.R.P., and above all a fairly clear indication that the Government is at least considering a policy to which the name "slump control" has become attached—that is to say an increase in public works expenditure when the curve of the trade cycle is on the downward grade. A first essential to such a policy is to plan in advance and in some detail actual projects on which work could be started at the appropriate time. The request by the Ministry of Health for five-year capital expenditure programmes from local authorities shows that this essential has been considered even though the work itself may, owing to the pressure of rearmament, be postponed for some time.

In the past there have been big fluctuations at different times in the proportion of the total building output accounted for by public bodies. These fluctuations have been largely due to variations in Government policy as regards housing, as shown by the various post-War Housing Acts. What has happened before may happen again, but on the whole—and taking into account broad social and economic factors such as the effect of taxation on the trend of income levels—I feel that private enterprise building is likely to account for a decreasing proportion of the output of the industry. By private enterprise building, I mean both building, whether

houses or factories, speculated by a builder, and those ordered under contract by a private individual or company. If this is correct, I think the future trend in the sphere of organisation is reasonably clear, because an industry whose main market is in the hands of the State is likely to have to submit to a good deal of State control. My suggestion is that the industry would be wise to meet this half-way: rather than building Noah's Arks regardless of cost on the assumption of "after us the deluge," that all sections of the industry should co-operate in improving costs and organisation from raw material to finished product. To give you an example of what I mean, one of the best speculative builders in the country who operates largely in an area where the working-class housing problem is very acute and the local authority rather difficult was saying the other day that as long as he could make money by speculative building he was not going to extend the contracting side of his business to tender to this local authority. This is what I call a negative attitude. As to a positive and constructive attitude, I think it is possible that the Royal Commission on the Geographical Distribution of the Population which is now sitting will recognise that there are certain towns which grew up on the basis of local raw materials which no longer exist, and which cannot hope to regenerate themselves by attracting new industries because they do not offer a location suitable for new industries. The annual sum paid by the Central Government for relief of unemployment in such towns may reach a figure of the same order as the total rateable value of the town, or even more. There is only one logical course in such cases, and an examination of the costs and savings involved suggests that it would be an economic course within a very short space of time, and that is to move the whole town to a suitable location. Here is a gigantic task for the building industry and one that could only properly be tackled by co-operation from raw material to finished product. There is rather a tendency for industry nowadays to expect the Government to take the initiative in everything. If the industry had a central body capable of anticipating demands and planning policy ahead on a scale such as this, it would greatly weaken the case for any interference in it from outside.

There are many other small fields which might be tackled—for instance, co-operation with the Board of Education on the replanning and rebuilding of schools. There is a very big national

programme here. Rural housing is another special problem and one which presents great difficulties on the side of the building industry. It also offers a big market, but as long as it is left to rural district councils and small local builders it is never likely to be satisfactorily tackled. Some of the big building firms have great mobility of equipment and organisation. If a group of them planned a system, with the backing of the leading building materials manufacturers, for tackling the problem area by area and employing local labour where possible, and let it be known that they were prepared to do this and the price at which it could, in typical cases, be done, I think they would quickly get the orders from local councils.

Scotland is, of course, very behind-hand in tackling the housing problem on an appropriate scale, though many special difficulties are involved up there. Nevertheless, the attitude of the State is illustrated by the terms of the Departmental Committee appointed in September "to inquire and report as to the reasons for the increase in the cost of building working-class houses in Scotland." That is the kind of enquiry which it should not be necessary for the State to appoint, particularly as I suspect that some of the reasons will blush when they see the light of day. At the present time the only action which the State can take regarding building costs is one which leads straight to stalemate. How many times in boom years and even for some time after a boom does one see that "in expectation of a drop in prices of building materials, the Ministry of Health has refused sanction for the new council housing estate at Puddleton." It is not easy for the building industry as a whole to learn the lesson that big turnover is more important than high prices; because it is not the prices of one but of a hundred different companies which affect the result.

The primary point which, as you will see, runs through my whole argument, is that from the point of view of the building owner, whether local authority undertaking housing, or industrial concern undertaking a new factory or extension, the main factor is the cost factor. Design is important, but cannot be separated from the cost. The cause which long delayed the present recovery in the American building industry was that the gap between costs and rents had not been bridged. In most other fields of the national economy concerned with the satisfaction of essential human needs there has developed large-scale production

and the problem has been to develop large-scale and efficient distribution which will bring the food, the fuel, and the clothing to the consumer at a price in reasonable relation to that at which it leaves the farm or factory. To a great extent we have now got large-scale production of building materials, but the consumer does not want a thousand bricks or a ton of cement—he wants a house or a factory or maybe on occasions a town hall. That is why the problem is so much more difficult in the building industry, and it is one which only close co-operation of the three chief and the two subsidiary partners can solve.

7. RESEARCH AND INFORMATION

Finally there are a few general points on which I should like to touch. Research is a subject on which everyone has views and I'm afraid I am no exception. In particular I wish to plead for an extension of economic research. A building materials manufacturer was complaining at his annual general meeting the other day of the inadequacy of building activity statistics. When examining the statistics of plans passed by 146 local authorities the other day, one of my colleagues found that there is good reason to suppose that in about five years the proportion of the total building activity of the country covered by these plans has varied by about 100 per cent. The Building Industries National Council has gone some way towards meeting the demand for statistical and economic data by collecting all available published information. But a full programme of economic research implies something much more than this—the collection of new information. An outline of the work which has been done and needs to be done was given in Chapter VII of the P.E.P. Report on Housing, and although that was published nearly four years ago, I regret to say that its substance still holds good.

One of the reasons why selling expenses in the industry are so high—this applies mainly to building materials but also affects other sections of the industry—is that information on work in hand is so fragmentary. Some of the trade journals do original work of sterling value in collecting contract news. Others merely copy such items from elsewhere; but at the best only a proportion of jobs on hand are covered, and there are big variations in coverage of different areas. There are some private services such as Porris, but they do not entirely fill the gap. Many firms have to organise their own

systems—which is quite an expensive item, at any rate to the smaller ones—and I have often felt this to be a suitable field for co-operative action.

As regards technical research there is an urgent need for a better mechanism for getting the result of such research used in the industry. The work of the Building Research Station still accounts for a very high proportion of the total technical research work done in the industry. It is, for instance, relatively much more important in the research field than the Fuel Research Station is in the fuel industries, or the Chemical Research Department in the chemical industries. The excellent work done is, however, perhaps necessarily published in a form which combines the erudition of a paper to the journal of a learned society with the guardedness of a Blue Book, and provision for “putting across” the results of research is an important need in the industry.

I have said nothing in all this about the town planner, not from any lack of respect but because I feel that it is partly a coincidence that town planning should have been linked with architecture and that it is likely in the future to develop into an entirely separate profession and to have its main affinities with land planning and utilisation as a whole. It will organise green belts and national parks and play a big part in the siting of industry. If the trend among architects is towards salaried employment, I can only feel that this is even more likely to be the case with town planners, as their place is in the counsels of local authorities. I hope their salaries will be high enough to attract men of the calibre that the job deserves. I suppose it will be for the next generation to clear up our mess in land planning just as we are coping with the clearance of the back-to-back hovels of early Victorian industrialisation. There can surely be no better example of shutting the stable door too late—and then only half-heartedly—than the Ribbon Development Act.

I should like to make a reference to the quality of building because here, too, action has come too late. The National Housebuilders' Registration Council has objects with which I do not think anyone could disagree, but meanwhile we have had Mrs. Borders in the box and committees of enraged homeowners on speculative estates all round the country who speak with feeling and some warmth of the building industry. In such cases other industries have found that there is no separation of the sheep from the goats. If the good can't

control the bad they will be tainted by them. This is a problem for the future. The average life of speculative housing may not be much over 40 or 50 years and it will have to be amortised, after which I hope we shall start again. But I doubt whether the rebuilding—and it will have to start very soon now—will be carried through by private enterprise on its present basis unless private enterprise can assume the responsibilities which are the counterpart of its liberties. So far the N.H.R.C. have not met with that wide measure of support which suggests that responsibilities are just what the smaller speculative builder wants.

If the part played by speculative building in housing as a whole declines, what happens to the building societies, with their enormous assets? Finance, as I said, should be the hand-maid of industry, but hand-maids—in other fields too—can be very useful and are often difficult to come by. If the co-operation from raw material to finished product which I envisage should come about, there will be a part for the building societies there. Many of them borrow at 3 to 3½ per cent. tax free and could lend at 5 per cent. There has been much housing carried out in recent years on nothing like a 5 per cent. basis.

VOTE OF THANKS AND DISCUSSION

Sir JONAH WALKER-SMITH, M.P. [*Hon. A.*] (Director of the National Federation of Building Trades Employers): I am sure that I shall have your sympathy when you appreciate that there has been allotted to me the space of three minutes only in which, as adequately as I can, to voice the thanks which we wish to express to Mr. Roskill for his paper this evening. You will readily agree that this paper is informative, critical and provocative—provocative in the best sense of the term in that it is certain to provoke very useful discussion.

I was a little surprised in the earlier stages of the paper to find the five categories into which Mr. Roskill divided the main interests concerned in the building industry. Manufacturers of building materials he places first and architects second, and then contractors, and then—a minor two—building owners and quantity surveyors. I was surprised to find that he omitted all reference to the building operatives, but I notice later that he regards the building contractors or employers and the building operatives as one single unit in the actual production, and I think in that he is paying a very high compliment to the building employers. At a later stage in the paper he expresses the view that the co-operation of those two parties has not been entirely without success, and therein I think he is certainly not placing their achievement too high. He also said that the building industry is one which is not very easy to administer in that access and entry into it is so simple and easy. Such success as the combined efforts of the employers and operatives may have had is certainly not due to the fact that it is in some measure a protected industry.

Perhaps I may, arising out of Mr. Roskill's comments, be allowed to say that the considerable success which those two bodies have had in their joint administration of the constructional side of the industry is on account of the policy which they have adopted and agreed to by mutual consent. Their agreement has been very effective because there has been no serious disturbance in this industry for the last fourteen or fifteen years. They have agreed that it is their best policy to co-operate to the fullest possible extent to maintain peace and to do everything possible to secure the progress and prosperity of the building industry in order that out of that industry, made prosperous by their joint efforts, the operatives may receive the best wages and conditions of labour which a prosperous industry may yield. That is the basis of the agreement between the parties and the reason why there has been such a long period of peace and such an appreciable measure of prosperity in the industry.

I must pass over a considerable number of topics which Mr. Roskill mentioned, but I should very much like to comment upon one on which he spoke at considerable length and which he termed "form of contract," although he did not mean form of contract in the sense in which I generally refer to it, as meaning the "Form and Conditions of Contract." In that respect I should like to express my sincere thanks and the thanks of the whole building industry to the members of the Royal Institute of British Architects for the help which they have rendered in preparing and securing the almost universal adoption of the R.I.B.A. standard form of general contract and for the way in which they have assisted in securing a standard form

of sub-contract and standard forms for local authority contracts and for Government contracts.

It is not that aspect of the matter of form of contract to which Mr. Roskill has chiefly directed his attention; he has dealt more with what I should have described as "methods" of contracting. He referred to the method of contracting which has been advocated by what is now known as the London Conference. I do not propose to comment upon that, because there are those in this room who are not only particularly interested in it but who can comment upon it far more freely and informatively than myself.

Another method of contracting to which he directed attention—and I gather that he did so with some sort of recommendation—was the method which he termed the "cost plus" system. It would appear that he regarded the "cost plus" system as something new but, from my own experience which is of considerable length, I can say that it is very far from being new; it has been in existence for a long time. On one occasion in the Ministry of Health in the years following closely on 1918, it was my duty to prepare a standard form of "cost plus" contract and to encourage contracts by that particular method. While I have had a great deal to do recently with the preparation of standard forms of contract, I hope that I shall not again be called upon to prepare a contract of the "cost plus" kind or to advocate its adoption. As a result of my experience, I could not advocate it with any degree of enthusiasm.

I should like to say something upon a part of the paper which may cause a certain amount of debate, and which deals with the methods adopted by manufacturers of materials to safeguard the interests of the public. Mr. Roskill seems to look with a rather benevolent eye upon rings, combines, price associations, honourable understandings and the whole gamut of those arrangements which tend to the regularisation of prices of materials. It may be that many of those concerned in these price-fixing arrangements are nowadays actuated by those higher motives to which the author referred, a principal motive being that of adequately serving the public interest. One of the very first jobs I ever had was to assist in the regulation of a price ring relating to a certain engineering product. In those days the manufacturers were wholeheartedly self-interested and so they frankly proclaimed themselves; their object and intention was to raise the price of the commodity which they had to sell to the highest extent which the market would bear. That was their main objective in those days; but now it would seem that the methods of steel, cement, and other associations which control the prices of building materials are quite different. They are apparently actuated by very much more worthy and public-spirited motives. If for no other purpose than ascertaining that fact, my visit here this evening has been very well worth while!

It only remains for me to propose a vote of thanks to Mr. Roskill for his most informative paper. As you will convey your thanks to him so you in turn will, I am sure, earn the thanks of a body extending far beyond the confines of this room as a result of the equally informative discussion which will no doubt follow.

Dr. BRINLEY THOMAS, M.A., Lecturer, Economics Department, London School of Economics: It gives me very great pleasure to second this vote of thanks to Mr. Roskill, who has been comprehensive, courageous and candid. I view this subject strictly from the point of view of an economist, and, as the time at my disposal is very short, I should like to say first of all a word or two on the question of what Mr. Roskill has called "slump control." I think it is well that we should realise, according to the figures which Mr. Colin Clark recently published, that out of a total home net investment in fixed capital of £268,000,000 in 1935, the production of houses accounted for £145,000,000. That figure shows that the production of houses is a very important item in our annual investment total. I agree with what Mr. Roskill said about the increasing part which the State is going to play in future in regard to the regulating of the volume of investment, and I should have liked to hear him being even more explicit on this particular aspect of his paper.

It will be remembered that in the years 1931-32 the Government, for reasons associated with the Budget, declared that it was necessary for local authorities to practise economy. Now, economy for a private individual means that he spends less on consumers' goods; economy for a public authority means in most cases that it spends less on investment goods. The two are quite different, and so all the arguments that go from the individual to the community in this particular respect are, I think, fallacious. Indeed, I am reminded of the story of Abraham Lincoln, who was once approached by one of his supporters, who said to him: "Sir, I wish to protest against the behaviour of one of your generals, General Grant. General Grant spends most of his time drinking whisky; he is a toper and not in a position to carry out the responsibilities of a general. I demand that General Grant be dismissed." Abraham Lincoln turned to him and said: "My friend, would you please tell me what brand of whisky General Grant usually drinks, so that I can send a cask to each one of my generals." I think that if in 1931-32 the particular brand of public investment carried out by local authorities had been encouraged instead of drastically cut down the slump which reached its lowest point at the end of 1932 would not have been as bad as it was.

I think that there is to-day a fair consensus of opinion among economists that public investment in building must be regarded as a counterweight to the variations in private investment in building, and that, of course,

means that we have to have at our disposal the statistics regarding the plans of all public and semi-public authorities, central and local. Mr. Roskill referred to the recent five-year plan which was suggested by the Ministry of Health, and that, of course, is only a beginning. I think there is a great deal to be done from the trade cycle point of view in bringing about a better ordering and planning of public building activity, so that we may be able to some extent to iron out industrial fluctuations.

The other point upon which I should like to touch is the very important question of price rings. I know perfectly well that this is a delicate question, but I should like very briefly, from the economist's point of view, to put it in this way. We all believe in competition when it is a question of people putting in for a job; we say "Let the best man get the job," and the best man presumably is the person who is best qualified to fulfil the requirements of the post. In the industrial system at large if we are competing in the supply of services or commodities, and if I, a competitor in that market, do not succeed in selling my service, then if the market is genuinely competitive I cannot single out any particular individual, or group of individuals, as being responsible for my loss. On the one hand, therefore, you have that kind of market where competition is genuine and where there is equality of opportunity, and at the other extreme you can have a corporate state; i.e., each little group will strive to make its own service relatively scarce so that the surplus of its receipts over its costs shall be at a maximum. The corporate state could be run, I suppose, and competitive conditions are feasible, but we lie somewhere between the two.

In the paper I could not quite find out exactly where Mr. Roskill stands on this vital matter. Is he or is he not in favour of the corporate state of private power politics, or is he in favour of genuinely competitive conditions? If he is in favour of genuinely competitive conditions then he will have to be a social revolutionary, because I think that it would need something like a social revolution to convert the *status quo* into a regime of genuinely competitive conditions. If, on the other hand, he believes in the corporate state—with, of course, the frills of British democracy added thereto—then I think he ought to make it perfectly clear where he thinks the State—the representatives of the community—have a say in the matter. Where does the community come in? I should like very much to see that point clarified.

For my own part, speaking as an economist who pays no heed, as far as his laboratory work is concerned, to party politics, I should like to say that we are in this No Man's Land. We have neither the one thing nor quite the other. We are, however, moving, I suppose, towards some kind of system. It seems to me that the State must take more and more interest in the doings of

price rings. It seems to me unjustifiable that private groups of owners should be able to contrive little scarcities of their own and maintain such private privileges and at the same time refuse to allow the Government, on behalf of the community, to exercise corresponding control. I believe that on this vital economic part of the subject it is for all of us to envisage in the future increasing State control, either to convert these private monopolies into social monopolies, or to convert them into separate agents which will take their part in a competitive field. I do not know which of those lines we are going to see developed, but privately I have a notion that it is going to be the one rather than the other.

I am sure that we have all enjoyed Mr. Roskill's paper, and I am also sure that in the discussion which is to follow we shall hear some very provocative opinions expressed.

Mr. R. COPPOCK (General Secretary, The National Federation of Building Trades Operatives): I was very interested in this paper, and I think that Mr. Roskill is extremely courageous to deal with the points which he did. Obviously his treatment of so many points in this great industry of ours must be a trifle sketchy, and he has left so many ends that it is difficult to trail him down on any one of them.

I am interested in the development of the industry and its changes and its practices, and, while I appreciate that Mr. Roskill spent a considerable amount of his time in trying to define the location of the particular sections within the industry, it would be difficult for him to show a direction in which more rapid change could take place in the industry than is taking place at the present time. He says that the labour side could ease the burden, but they could not do so without economic distress to their own people. The practices of the industry are changing every day. The practices which were heretofore in operation are being changed and varied. The architect has varied the practices of the industry because he is just as much a slave to the machine-tool as the workers in the industry; his work is affected thereby, and only very occasionally can he break away from it—and when he does, it is the Liverpool Cathedral!

There is no industry which has done more to try to face its responsibilities. It is true that it is very difficult to cartelise our industry, and I hope that it will long continue to be difficult, unless the industry is cartelised by the State, for cartelisation in our industry would bring exploitation not of the labour unions in the industry but of the building owners, as most cartelisation does.

The building workman is not so mobile to-day as he was, not because of choice as far as he is concerned but because of State regulations. Unemployment insurance has demobilised, if I may say so, the building trade worker. We have attempted within the industry to make him more mobile by the unification of rates of wages from town to town throughout the country, and a slight examination of the work of employers and operatives during the last twenty years will suffice to show that there is no other industry which has faced the economic position of its workers more than has the building industry.

The question of salesmanship in the industry has been raised. What have we to sell? We have only to sell homes and buildings, and it is impossible for us to sell as the cheapjack sells on

the local market place. We cannot have a Dutch auction in our industry because a Dutch auction means reduction of the economic position of persons dependent on the industry for wages. During the boom of building in London I went round listening to the selling agents. A man who wanted a £1,000 house was driven to the house in a Rolls-Royce; if he wanted a £700 house he was taken there in a 16-h.p. Austin, and if he wanted a £600 house he was taken in a 10-h.p. Morris; while if he wanted a house costing less than £600 he usually went in an Austin Seven. That was the type of salesman who met people at the station, and the salesmanship displayed at that time usually ended up by an electric clock on the mantelpiece, which charmed the ladies, or a special kitchenette for ironing. No consideration was given to structure, and no salesman can sell structure, yet structure is the fundamental basis as far as the industry is concerned.

It is not true to say that the industry has not examined new materials. I, together with my colleagues, was on what we used to term the "Cranks' Committee," a committee which investigated new materials for use in building. We met every crank imaginable, we measured his ideas, and we dismissed many of them; but all good ideas have been fitted into the industry.

It is true that our buildings stand for longer than some of us would desire, but the veneration of old buildings is the basis of the glory of the architect's profession and of his general study.

We in the industry have examined the industry. I am one of those who are against competitive tenders, for competitive tendering as it goes on to-day means that the contract usually goes to the man who has made the biggest mistake or is the biggest fool in the industry. I am in the position of opening tenders, although I am a workmen's representative, and I see the effort to get uniformity, and the stranger coming in. The stranger comes in, but he does not last long; he sets out on the well-known voyage to Carey Street, due mainly to carelessness in an understanding of the general industrial situation.

Competitive tendering is responsible for the difficulties with which we are faced on the economic plane in improving the material conditions of the million men who are working in the industry. Before we get our share the cream has been licked off by numbers of people who toil not neither do they spin, but their heavenly Father looks after them in such ways that they seem to do much better than we do! How much money is spent in advertising properties that nobody wants! Five, ten, twenty or thirty brick firms will advertise, and the only difference between one brick and another is that one is possibly red and the other is pale. It is a big task for the architect to keep pace with modern advertising. I agree that the advertiser is shown the door on more occasions than one. In my office the man who calls is usually selling stationery.

I appreciate the viewpoint which has been expressed, however, by Mr. Roskill, because it is turning our minds to the problems affecting our general industry. Our industry is more open than any other in the country. In the last year, a year of recession, 15,000 men were added to the building trade pool in this country. There is no industry in the country which employs so large a personnel as ours. We know, and the economists know, how much the success of the nation is bound up with the success of the building industry. It took a slump to prove that to the economists, and it was a very hard task for us to tell the world in 1931 that that was the position. I am pleased to hear an economist to-night, however, agree with that point of view, having regard to the fact

that the rank and file who do not profess to be economists discovered this very early, long before the economists, and now the economists are echoing it as a new discovery.

I agree that the association of the various elements in the trade together is an essential factor. There is no other industry in Great Britain which has formed an organisation on the same basis as ourselves. Employers, architects, manufacturers of building material, surveyors and operatives can meet together and discuss general policy as far as the industry is concerned without falling out with one another on the economic plane as far as wages are concerned. There is no other industry which has attempted to put its house in order in precisely the same way that we have.

One of our difficulties is that when things are good no one worries. The investor is doing well, and, as I say, nobody worries at all. We have had difficulties on many occasions in getting proper consideration of the problems of the industry.

Mr. Roskill talks about a reduction in costs giving greater opportunities for sale, but I do not agree that that is true. If we were able to build town halls for 1s. 6d. a time, do you think that there would be town halls at every street corner? We only want one at a time. We shall not build thousands of baths because we can produce a lido at a very cheap price. We cannot build all the houses that we should like to build on a particular site because the State has decided to introduce town planning, and therefore there are limitations. We are not like the confectioner who the cheaper he makes the buns the more he sells of them. Furthermore, it is not true to say that our general organisation is such as to hinder production. In the last few months there has been going on what I consider to be the most remarkable building project in this nation and, I think, not in this nation only but in Europe and the world, and that is the Chorley munition factory, where between £5,000,000 and £6,000,000 worth of work has been done in fifteen to eighteen months, and where the organisation has been absolutely perfect. There have been difficulties with regard to details, but there has been a general fitting in by the building personnel, by the architectural profession and by all the general services to a degree which I think means that we have produced the greatest record the world has ever known in the building of that factory, and that has occurred while most of us have been passing our time in other spheres.

I am satisfied that as long as the industry itself appreciates its dependence upon each factor within it all will be well. I appreciate that the price ring is an important factor, but I am not worrying about the price ring; the more they "ring" the better and easier it will be when the day comes to take over control, to take over the industry, and I believe that that is merely a question of time. I do not think that it is possible for us to rail against these people because finance capital is developing not only in the production of building material but in all spheres, and finance capital is controlling a large number of industrial concerns at the present time. As far as our industry is concerned, during the time that we have been in charge of affairs we can say that we have made more progress in the post-war years in the building industry than ever before. We have studied the requirements of the public, we have enlivened the mind of the State, we have increased the activities of the municipalities, and there has been a democratising influence as far as architects and chartered surveyors are concerned. We have laid the basis of progress on a democratic foundation of understanding right from the navy, whom I represent, up to the architect, who is represented by our President to-night. I am very

proud that during our lifetime we have been able to co-ordinate that general policy. There are many defects in our industry and we suffer from them, but the progress which is going on is sure, and, if progress goes on, having regard to the fact that the development means a better life for those who have to turn the plans of the architect into reality, then I think it is well worth while.

Mr. H. B. BRYANT: I should like to begin my remarks by congratulating Mr. Roskill on his temerity: I think he must indeed be both bold and brave to come here and say the things that he has said. I must, however, add that in my opinion much of his paper is based upon fallacy, and many of his statements are, in consequence, fallacious.

I think that the main error which Mr. Roskill made was in approaching his subject from a negative point of view in divorcing the industry from its singular background, i.e., the conditions under which it is forced to operate and the mass of regulations governing its activity. If, and imposed from outside, Mr. Roskill's object was to attempt to indicate lines of reform, then, as Dr. Brinley Thomas said, he has attempted to build on foundations which do not, in fact, exist, although they may be present in other industries.

The background of the industry at the present time is very largely the shifting pattern of spasmodic and chaotic economic influences which change from day to day and are entirely divorced from any principle of stability, continuity, or co-ordination. Until this background can be improved, so that the industry has a fair chance of maintaining itself in connection therewith, much the greater part of the measures which Mr. Roskill is anxious to see accomplished are incapable of realisation even if they were desirable. In any event most of the evils to which Mr. Roskill refers have their roots in the background of the industry (that is, the condition under which it has to operate) and not in the industry itself.

The second weakness in the paper is that Mr. Roskill assumes that the building industry is similar to an ordinary manufacturing industry functioning in the open competitive market. In fact the building industry is fundamentally different from any other form of productive activity.

The building industry is the foremost social instrument which the country possesses, and without a clear realisation of that fact and all that it implies it is not possible to obtain a clear conspectus either of its functions or of its economic effects.

One third of its total output arises from social policy and emanates from Government enterprise, either directly through Government Departments or through the local authorities. That proportion is gradually but surely increasing, and in that third the criterion which Mr. Roskill (quite rightly from certain points of view) adopts, namely, costs, cannot properly be used for that purpose. It is a type of industrial activity which is an essential form of social progress, and is thus a reflection of national social policy.

It is the implementation of public opinion, and to that extent public opinion determines the most stable part of building activity.

The other and declining two-thirds, represented by what is loosely referred to as private enterprise, is very largely the result of unformulated application of the law of supply and demand, and it is unformulated because it functions in a field which is at present entirely unco-ordinated. It may be possible in certain circumstances to apply the criterion of cost to this two-thirds as indicative of the progress and activity

of the industry, but I do not think that even there costs represent the last word in sound judgment, because in that two-thirds, and especially in housing, we have a field which is subject to extremely rigorous legislative regulation. The remaining portion of the two-thirds is, moreover, subject to a further degree of control by public authorities through their byelaws. The ordinary manufacturer does not have to go to a local authority and ask permission to carry on his activities, but the unfortunate builder and building owner are compelled to by law. The lawyer when he draws up an agreement does not have to go to the local authority and ask whether it is in accordance with their views, but the architect has on all occasions to submit his plans to them, and whatever his professional standing he must submit to a form of technical and aesthetic control with which he may have scant sympathy.

Throughout the building industry there is a measure of control the rules of which are a heritage of the dark ages of the Industrial Revolution and to which have been added vast masses of detailed regulations. The desirable direction of change is certainly along the lines of the self-determination of the industry, but that view is only just beginning to receive attention by the industry organised as a unit.

I think that Mr. Roskill has given an unnecessarily black picture of the state of the industry. He left us with the impression that little was well with the industry, that a very large and far-reaching measure of reform was necessary, and that that reform might be imposed upon the industry from outside. There may be something in that, but we have to remember that there is another side to the picture and it is that the building industry is one of the few industries which has really been tested, as it were, in the fire of misfortune. The workers in the building industry, from the architect to the labourer, had a very bad time indeed in 1931, a time such as one hopes the country will never see again, and, as a result of that, everyone even remotely dependent on the industry had a very bad time, to the extent of nearly four million persons who were deprived to some very material extent of their means of livelihood. But while that was very bad for the members of the industry, and their dependants, the products of the industry and their investment value remained at a level phenomenally high in comparison with all the other avenues of investment in the country. The total investments at that time, which amounted to something in excess of £25,000,000,000, slumped very badly, and there was hardly an industrial security during that period which did not slump by 50 per cent. But the products of the building industry, the investments in buildings themselves and the value of the buildings maintained during that period a very high level. There may be valid grounds for criticism of the building industry, but any industry which could maintain in such a period that stable measure of value in its products cannot in the last resort be said to be either inefficient or unprogressive.

I, of course, welcome the paper, in so far as it serves a constructive purpose. The more opportunities we have of examining ourselves and finding out our faults and discussing them the better, and I hope that this will not prove to be the last occasion on which we shall have the pleasure of an evening such as this. I would like to add, however, that it is easy to pick faults in any industry, especially after a period of unprecedented expansion. Mr. Roskill's title, but not his paper, refers to achievements, and I feel that those achievements have been both well conceived and far-reaching, holding much promise for the future.

This has been done by the working members of the industry itself, at infinitesimal cost, and not, as in so many industries, by imposing on the industry a large annual charge. No one is more conscious than those actively participating in it of the immense possibilities of this new development, and of the very large field which needs still to be covered. It is, however, also realised that this whole development (and a large part of its success is due to this fact) springs from the needs of the industry itself, as realised by its leading members.

The development of central organisation is thus founded, as it must be to achieve permanency, on a broad basis of industrial evolution. Mr. Roskill appears to have fallen into the commonplace error of forgetting that the faults of to-day were the reforms of yesterday, and that the remedies of to-day will be faults urgently calling for reform to-morrow. Industrial organisation is essentially fluid and flexible, and not a stable entity to be confined within the limits of a rigid plan, however well conceived it may appear to be at the time. Only by the preservation of the utmost flexibility in the institutions of the industry, and particularly those dealing with labour conditions and problems, could a period of unprecedented technical change and also of unprecedented increases of output have been successfully surmounted without disturbance and with little change in basic costs.

Whatever unrelated elements there may have been are capable of being influenced when the industry as a whole, through the central organisation, approaches the responsible body, such as, for instance, the railways, in the matter of freight sales, should the occasion arise. Moreover, Mr. Roskill's paper does not betray even the slightest acquaintance with the machinery of the industry for dealing with all points of difficulty as they arise on all matters, including form and conditions of contract, byelaws, standardisation, standards of craftsmanship and working conditions, all of which is related to the fact that, in spite of Mr. Roskill's apparent contempt of the position of the architect, the industry maintains the highest standard of technical and architectural training, in a composite sense, possibly in the world. Moreover, this training is being extended to embrace all those newer features which may be regarded as permanent, and not mere transitory innovations. Thus, while the industry is, of course, faced with many problems, especially on the economic side, concerted machinery exists for dealing effectively with every one of them.

Finally, Mr. Roskill ignores the fundamental fact that building throughout the ages has always been the highest form of expression of those moral, national and social ideals which we call civilisation, and whatever faults the industry may have judged by commercial criteria, it still remains the "gentleman" among industries, and will continue to be so while architecture occupies the proud position of Mother of the Arts.

Major H. C. CORLETTE [F.] : I venture to offer a brief contribution to this discussion. When I saw the summary of the paper I asked for a copy of it because it seemed to me to be an interesting one, but I have put my notes down in case I am tempted to talk too much.

A year ago we were told here by Mr. Frank Pick that there must be planners who can and will plan the planners. This paper is, it seems, the plan of one of these planners to plan planners. The substance, the purpose and the aim of it seems to be to plan out of existence the architect: in independent practice, to get rid of those very able and efficient men, the

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small local builders who really are builders and not merely contractors, and also to put the whole vast body of skilled artisans, those wonderful sustainers of a trained traditional scientific skill, the operatives, under the heel of the financial manipulators of the building industry. In the interests of architecture and of the whole building industry, the Royal Institute of British Architects must resist such a policy, if it exists, or else tear up its charter and sink into a deserved insignificance. We do not exist to serve the interests of architects but to support the integrity of one of the greatest industries in the country, and in doing this we must contribute our share towards the defence of the just rights, privileges and prosperity of all concerned in it, be they builders big or small, operatives skilled or not, surveyors, suppliers of building material and others, whether they have big capital resources or none.

Mr. Roskill refers to a P.E.P. report on housing, a useful and able study of conditions. We have been told that these letters signify the "Political and Economic Planning Group," and of this group Mr. Roskill is said to be an important member. Inquiry shows that they pursue a large and comprehensive policy apparently not much known, but it appears that it was issued in 1933 and can now be found, though not easily, in published form. It is called "Freedom and Planning." To me it reads as a plan for the direct reversal of any sort of freedom; its aim is monopolisation and nationalisation of everything and everybody. It proposes to get rid of the 500,000 or more retail shops, which, it says, "cannot be allowed to continue." Why? To give more scope to monopoly and the growth of chain stores, and so on. It has a national plan for everything—industry, property, land, banks, agriculture, coal-mining, transport. All this might suit a handbook to Berlin or Rome or Moscow, but it will not do in London. It is so simply and sweetly dictatorial and, one might add, destructive of all English ideas and of what we call our liberties. It might be a good thing if our own Public Relations Committee examined it with care to see how far it is connected with the Building Industries National Council, the proposed National Industrial Council, the Industrial Reorganisation League and other reorganisation, or disorganisation, schemes of which we hear so much from the itinerant planners who are to plan the other planners. Some of the architects, so-called, Mr. Roskill meets are of a variety he will not find here. And the people he discusses are not partners in the building industry. They exchange skilled experiences but do not buy or sell each other. An architect builds and constructs his work by arranging a co-ordination and co-operation of all who may act as contractors with any personal or corporate employer.

Mr. MAX NICHOLSON (General Secretary of P.E.P.) : I happen to be the general secretary of P.E.P., and though I rather doubt the relevance of some of the observations of the last speaker, I should like to say that this alleged document, "Freedom and Planning," was never published by P.E.P. at all, but was a personal memorandum written by an extremely respectable member of the board of the Bank of England, the late Sir Basil Blackett, on his own responsibility. It was circulated to P.E.P. and in 1932 was published in a book by him called *Planned Money*. It has never been accepted by my organisation and it does not now represent, and has never at any time represented, the policy of my organisation; and that is that.

While I am on my feet I should like to say one or two

words which are slightly more relevant to the discussion, and to bring up the subject of population. A great deal has been said about what the building industry has done during the past fifteen years, but we must remember that during that period the adult population of this country has been increasing faster than ever before, and the number of separate families has been increasing faster than ever before, and there has existed a huge unsatisfied middle-class demand. It seems very likely that those features are gradually, if not rapidly, drawing to an end, and part of the challenge to the building industry in the next fifteen or twenty years—to give it a rather long span—is going to be how to adapt itself to a period of falling population and a stable number of families, a period when all the arrears which have been of advantage from a production point of view have been caught up. I am not sure that that has been sufficiently taken into account in the previous discussion.

Mr. GEORGE HICKS, M.P. [*Hon. A.*] (President, The National Federation of Building Trades Operatives): I have been relieved of a very uncomfortable feeling that it is time that someone got up to support the reader of the paper. Mr. Nicholson has done so, so that there is no need for me to do it. I am certain that we are very grateful to him for putting forward the ideas that he has, and we should be ungrateful indeed if we did not appreciate the many points he has raised, subjects which can very well be considered in greater detail later on to see how far any of his suggestions are capable of being embodied in the general practices of the building industry. I think that Mr. Roskill was healthily impudent in putting forward a number of his proposals, but we welcome them in spite of that. While it is true that we are a very old-fashioned industry, I am certain there has been, as Mr. Coppock said, tremendous progress made in our industry. To those who really know about our practices and who compare them to-day with what they were a few years ago there has been a revolutionary change. The operative is no longer regarded as having horns on his head when an architect comes round; the architect is quite pleased to fraternise with him and find out things which help him to do his job better.

It is not possible to traverse in a short speech the whole of this extensive paper, but there is one point which I should like to make. We should like to have a chance of replying to some of the points which Mr. Roskill has made, and if the architects will invite us again one night we might occupy the rostrum and give a reply, and Mr. Roskill can sit in the audience and give us the benefit of his criticisms. The point I want to make, however, is the effort which is now being made by the building industry itself to get down to all the problems which affect the industry from the point of view of the architect, the point of view of the manufacturer, the point of view of the contractor and the point of view of the operative, all meeting together under the auspices of the Building Industries National Council. We have as a country escaped from the terrible conditions which threatened us during a few weeks in September, but there has been a definite challenge to the whole of our building in that crisis, and the question of A.R.P. precautions will influence building for a very long time to come all over the country. There must be a tremendous examination into this problem to see how far we are able to put forward practical proposals in the event of "mad persons" breaking loose and attacking us, so that we can offer the maximum amount of protection

possible to the civil population. In that connection the Building Industries National Council have been conducting an examination, and they are considering the problem in very great detail in regard to its effect on building and on the type and character of materials and on planning. The question of labour is not being left out either.

Major Corlette spoke of a possible relation between P.E.P. and the Building Industries National Council, and I should like to say that P.E.P. has no relationship with the Council so far as an organic relationship is concerned, but if P.E.P. have valuable ideas we may be able to benefit by them, because we are not organised against ideas and opinions and will gladly accept them from any source, whether they are put forward in a critical or in a constructive way. Mr. Roskill ought to look at some of the papers prepared for the Building Industries National Council, at some of our efforts to deal with the rationalisation which is taking place in the building industry and to secure an alteration in old-fashioned byelaws of local authorities which hamper and impede building, not so that we may put up a more shoddy commodity but so as to bring those regulations into line with modern progress and development and materials. All that is being examined by the Building Industries National Council, and we have the best of our men on that Council, together with women who are willing to come and give their ideas in order that we may do our best for the community for whom we work. We have to consider them, but at the same time we have to instruct them, and it will be a sad day when we come on to a straight line in everything that we have to do. I should like to see a development of the practice of the architect imparting some beauty and some special feature of attractiveness into his designs because I think the idea of the straight line is a bad thing; the outside of the house belongs to the public. I want, when I walk down the street, to see buildings worth looking at and which I can admire. I want the boys who are to be trained in our trade to have the elements of craftsmanship taught to them. It is eminently desirable that that should be done, and if clients have to be told that they cannot have the job done as quickly as they imagine, well, that is good for them, instead of rushing the job through so that they may make more profit out of it.

You can rest assured, however, that we in this industry are not static; we are not standing still. The organisations of operatives and employers and the other organisations in the building industry are frequently in touch with each other, attempting to see what best can be done to serve our community in a more efficient and better way, and in a cheaper way if possible, but cheapness must not come with debasement of the commodity which we produce; it can come by co-ordination, by removing unnecessary restrictions, by co-operation and by the fullest use of the brains and ability which everyone has to offer. If we had the technical experts to whom Mr. Roskill has referred and whom it would be necessary for us to consult from time to time, we should never know what shares they had in cement companies, lead companies and zinc companies, and we might be advised against our own interest because of the particular interest of the adviser.

Major CORLETTE: May I, with permission, add a brief reply to the remarks by the Secretary of P.E.P. As I said, "Freedom and Planning" was "issued" as a confidential document and it was first printed in Paris. But the policy it contains in full was declared in a speech at a luncheon at the

Savoy Hotel on 29 March 1933 by a Vice-President of the Federated Multiple Shop Proprietors whom I need not name.

Mr. A. W. BARR (Secretary A.A.S.T.A.) : Mr. Roskill divided his paper into five sections, and I think something has been said, and said adequately, on at least four of them. I should like to say a word more, however, with regard to the profession itself, and in particular the salaried section of it, because Mr. Roskill seems to be under a misapprehension as to its future. He implied that the future of the architect was to become merely a consultant, and also that design and æsthetics were rather outside the scope of the salaried architect. I believe, like many of the younger people in the profession, that the future is in the main, though of course not entirely, with the salaried architect.

I should like to link this up with the problem of planning, because planning is not only an economic question, but is a question of changing the face of the country, of planning towns and industry in good relation. If only the profession during the last century had paid more attention to this aspect of planning it would have been easier for it to put its views forward with effect and to deal with questions of economic planning to-day.

Mr. Roskill also said that we should not rely too much upon the State, but that the building industry must put its own house in order and put forward its own plans. I think that this applies strongly also to the architectural profession. I know that the Institute is doing a good deal behind the scenes and with its exhibitions to show the public what part the architect can play in planning ; but when I consider the immense amount of work which is not under the control and direction of architects to-day, the greater bulk of municipal housing, baths and washhouses and so on, I think that something more could be done. A very good start in this direction would be first of all to arouse more enthusiasm among the members of our own profession as to what architects could do for municipalities if they were given their proper status in the organisation of municipalities. I am putting forward no brief exclusively for salaried architects, because the example of the Finsbury Borough Council shows the excellent work which can be done by private architects as well. If we were to arouse our own profession to a greater consciousness of what could be done in this direction we should have more effect in making representations to local authorities and to the Government, because those authorities will listen to polite deputations only when they know that the demand of the profession as a whole is behind them.

Mr. T. A. DARCY BRADDELL [F.] : I feel that with the exception of Mr. George Hicks we have not been nearly nice enough to Mr. Roskill to-night. We asked him to come and read a paper, and he has read a very amusing and delightful paper, every word of which I have enjoyed, and all we have done in response is to give him one continual nag, nag, nag. That is not the proper way to treat gentlemen who come to amuse us, as Mr. Roskill has done.

There is one point, however, which I would bring to his notice, and that is that so far as I can make out he seems to have come across only the baser elements of our profession. I do not like this picture of the architect who sends jobs out to tender without even half-inch details, and with not even one-eighth scale properly drawn, but only a sketch, and who p.c.s vast sums and gets other people to do his drawings. It may be true of parties who are not in this room, but I feel

that it is not true of us, and I should like him to change his angle and appreciate the good architect as he really is.

The PRESIDENT put the vote of thanks, which was carried unanimously, with acclamation.

Mr. OLIVER W. ROSKILL (in reply) : I should like to thank you very much indeed. You have been a great deal kinder to me than I expected, though I think I know which of my two advisers was right ! I have been accused of everything from temerity to impudence, but I think that it is to the credit of the Institute that it should have met that with kindness.

Sir Jonah Walker-Smith accused me of liking "cost plus," but in fact I hate "cost plus" and should like to make that clear. There is, however, a trend to-day to use a modified "cost plus" system which is becoming more common ; I do not attempt to pass an opinion on it but merely to register it as a fact which has to be reckoned with in the forms of contract used in the industry.

Dr. Thomas asked me whether we were going back to *laissez-faire* or on to a planned or, I think he said, corporate economy. I should not like to answer that, nor do I think it altogether a fair question on my paper. I am merely trying to give you the facts as I see them from outside the industry, but as the question has been raised I should like to make it clear that I speak from my professional point of view as an industrial consultant and not as a member of any organisation of any kind. I should also like to make it clear that, although a technical man, I am not one of those technical experts to whom Mr. Hicks referred in not very complimentary terms which, however, I think are not altogether justified on his part. I would like to push home the point that the technical specialist can play a far bigger part in assisting the architect than he is allowed to do at the present time.

Mr. Coppock referred to his "Cranks Committee." I wish that I had a seat on that committee ! He said that all good new materials or systems are taken up. In spite of having been treated very kindly by him, I disagree most fundamentally. I could give him several examples of materials of merit which were being offered round in the boom of 1928 but which failed to get taken up and naturally had to pass through the slump, and were then offered round again in 1935-36 until eventually, perhaps after ten years, they may have been financed and taken up. Taking a period of a hundred years it may be right to say that things get taken up eventually, but there is a dreadful time lag which compares badly even with that in the engineering industry and the speed with which it takes up new products. You have only to see what happens in America to realise how far behind this country is in the matter, even in the engineering industry.

The Building Industries National Council has been mentioned. I have tried to indicate that in my opinion that is a unique organisation in this industry, which is

in a position to act as the co-ordinating body which I regard as so essential between the five partners in the industry. I do not suggest for a moment that it is not pursuing that policy, but I feel that the policy could be carried very much further with the support of all the sections of the industry if it were realised how important it is that we should not have building owner, architect, builder, building materials manufacturer and quantity surveyor all at loggerheads with one another, as frequently happens.

I think that a somewhat roseate light was thrown by Mr. Coppock on the Chorley armament factory. I know Chorley but I have never studied the inside from the point of view mentioned. I have, however, studied from the building point of view a number of other Government armament works, particularly in connection with Air Force contracts, and I regard them as a crying scandal. I think that with regard to methods, the system of contract and in many cases the materials and the finished results and the costs, they are nothing but a scandal.

I do not want to get rid of the independent architect, and I never wished to suggest that for a moment; the point which I was trying to make was that I believe the trend is for the independent architect to begin to disappear and I think that he is likely to be replaced by the salaried architect and also by a consultative type of architect. I threw that out merely as a suggestion, and perhaps rather too much was made of it in the discussion.

With regard to accusations against the architectural profession, which it is suggested are unjustified, I should

like to say that I am naturally aware of the fact that they are exceptional cases, but I know of a number of instances in which things of this kind have occurred. I do not suggest that they are very widespread, but a profession is bound to be judged by its practices taken at their worst and the best architects are going to be tainted by those practices, particularly as they affect the contractor and sub-contractor so intimately, and are the origin of price rings in many cases among sub-contractors. I think that that is the answer.

Mr. Roskill has added the following written contribution to his reply:—

I think it was Mr. Hicks who suggested that the cost of the finished product is not a matter of great importance in the building industry and Mr. Bryant appeared to support him as far as local authority housing is concerned. This is an attitude with which I am in fundamental disagreement and one which I find surprising in a legislator. A large proportion of building at the present time is what might be described as institutional—blocks of offices, flats, factories, etc. It is common knowledge that the volume of constructional work under this head is greatly affected by price and I know of a number of cases in which work proposed has been postponed because of high building costs. That it is true of speculative housing seems equally indisputable. The public may buy a home because of the kitchen sink but it is a keen judge of comparative prices for equivalent or apparently equivalent articles. If it is local authority housing that is referred to, it amounts to saying that the size of the bill doesn't matter if the State is paying it.

SPECIAL GENERAL MEETING

A Special General Meeting of the Royal Institute was held on Monday, 21 November 1938, at 10 p.m., immediately on the conclusion of the Second General Meeting of the Session, Mr. H. S. GOODHART-RENDEL (President) occupying the chair.

The PRESIDENT: This is a Special General Meeting held for the purpose of considering and, if thought fit, of passing the following resolution, which I now propose:—

“That the Council be authorised to raise by way of loan from the Prudential Assurance Company, Ltd., secured by registered charge upon the Institute's pro-

perties Nos. 66 and 68 Portland Place, London, W.1, such sum upon such terms as to interest and capital repayment as have been agreed between the Council and the Prudential Assurance Company, Ltd.”

Mr. W. H. ANSELL (Hon. Secretary): I beg to second the resolution.

The PRESIDENT: I put that resolution to the meeting.

The resolution was carried unanimously.

The PRESIDENT: That concludes the business of the meeting.

SIR RAYMOND UNWIN'S SPEECH

ON THE OCCASION OF THE PRESENTATION TO HIM OF THE HOWARD MEMORIAL MEDAL

On Wednesday, 23 November, Sir Raymond Unwin received the Howard Memorial Medal at a dinner in Grosvenor House, organised by the Garden Cities and Town Planning Association, whose award the medal is.

Mr. Cecil Harmsworth, who was in the chair, presented the medal to Sir Raymond, and the Minister of Health, appropriately fulfilling the duty implied by his title, proposed his health.

In the course of his reply to the toast, Sir Raymond spoke as follows:—

If you, Sir, during your ministry, could establish for this country a national board or commission to study this problem of distribution, and to embody their findings in a master plan to serve as a guiding basis—not a strait-jacket, and if you could establish for this vast city a regional board to provide a basis and to give guidance and support to the hundred or more local planning authorities who are trying in vain to make a coherent plan out of the crazy patchwork which their areas represent in the Greater London region, you would have earned the gift of this medal far better than I have!

The true purpose of planning, said Sir Raymond, does not lie in the imposition of restraints and restrictions, necessary incidentally as some of them may be. That purpose is to afford greater and wider opportunities for securing the right location of human activities, and for creating in our pleasant land an environment more appropriate than any which could possibly result from haphazard development, and to foster a new and better order of life.

We may at least, he continued, be thankful that our people have so far been spared any attempts to impose a planned order upon them by the means, often as brutal as they are antiquated, which dictators are too liable to adopt.

In the evolution of human affairs, however, time will not tarry for the irresolute. The reasons I have named for slow progress are no longer valid. We have now the knowledge and experience, possessing which decision is demanded.

I notice in our tubes, said Sir Raymond, that we are being specially congratulated by the Transport Board because every Londoner last year wasted his time in 411 journeys, whereas in the previous year he managed with 398. I wonder if the Board realise how comic that boast, based on the absence of reasonably effective planning, looks to a planner!

No solution, said Sir Raymond, is in sight along the way of central congestion, which I am sorry to see

is being foolishly followed here. Fortunately, we may find something more hopeful in the experience gained at Letchworth, where a new town or garden city has been developed with the full equipment of industrial, business, cultural and residential buildings; the latter affording an extreme contrast to congestion, the dwellings averaging less than seven to the acre. This experience is being confirmed at Welwyn and Wythenshawe. We now know the amount of space needed to provide generously for these several needs. Simple calculations show that if the whole of the population of 41 millions, expected to be found in England and Wales in 1941, were to be accommodated in towns or satellite units planned as generously as Letchworth, and if within those towns an allowance of playing fields and recreation grounds of seven acres for each thousand of the population were included, only 7.3 per cent. of the area of England and Wales would be needed; that is, 4,313 square miles. From evidence given to the Royal Commission by the Board of Agriculture, I believe the existing unplanned and congested towns, which accommodate the urban parts of our population only, already sprawl over 6,500 square miles, to the extent at least of rendering that area useless for farming. If this is correct, we have one more startling proof both of the futility of congestion and of the relative waste of land entailed by unplanned towns as compared with the most liberal garden city or satellite accommodation properly planned.

Planners, he concluded, have realised for some time that the figure of only 7.3 per cent. needed to urbanise on generous lines the whole population only serves to emphasise the fact that town and country planning are one; that the problem does not consist in trying to preserve a meagre scattering of open spaces on a limited area of potential urban development; that, on the contrary, it consists in designing an appropriate embroidery of urban centres and connections on a green background of land, which will occupy well over 90 per cent. of the area; that, moreover, the success of the design must depend on maintaining the right distribution and the appropriate relations between the pattern and its background. This is as essential for healthy national life as it is for safety from air raids; as important for urban industry as it is for rural agriculture. This approach will alone secure the adequate opportunities and freedom for local planning which national and regional master plans, defining these major distributions and relations, can afford.

A.B.S. APPEAL



A month ago the President appealed through the architectural journals in England for greater support for the A.B.S. from the thirteen thousand or so members of the profession. At the same time the President of the Birmingham and Five Counties A.A. appealed to his members. As a result contributions have been received from about 160 archi-

tecs and the total amount collected either in donation or as instalments of subscriptions is (on 30 November) just £250.

A quarter of this comes from the Birmingham appeal, which means that one society has produced

a quarter of what the whole of the rest of Great Britain has produced. There are twenty-six major architectural societies in Great Britain and Northern Ireland, including London as one. On the Birmingham scale £1,600 should have been raised, and not a paltry £250. What other Allied Societies are prepared to take up the challenge?

No one possibly can have failed to notice the President's appeal, which not only was published in almost every journal when it was first made, but was repeated by Mr. Goodhart-Rendel in his Presidential Address. It is beyond the means of the A.B.S.'s central office to write personally to every architect in the country, but the fact that they cannot do so does not mean that the appeal is not directed personally to every architect; at any rate every architect can give it the benefit of the doubt and act as if he had actually been asked personally. But why should all this silly elaboration of persuasion be necessary to win the support of the profession for a society which should by its name and works commend itself—£250 is not enough.

THE CONCERT ON 25 NOVEMBER

The concert on 25 November organised by the R.I.B.A. Music Group was devoted to the compositions of Victor Babin, a young Latvian composer and pianist. He and his wife, Vitya Vronsky, have become notable in concerts and broadcasts playing on two pianos.

The programme was arranged largely in chronological order of composition, the "Fantasia, Aria and Capriccio" for piano solo, played by the composer himself, being his first work to be published in this country.

A group of songs, "Life's Midway" and "The Night Wanderer," settings of Hölderlin's poems, sung in English by Lawrence Holmes, were admirably suited to the singer's pleasant baritone voice. The more broadly dramatic "Biblische Ballade" (Stefan Zweig) made an impression.

A second group of songs, settings of Stefan Zweig's two poems "Graues Land" and "Winter," and the two Hölderlin poems "Sonnenuntergang" and "Hymne an die Unsterblichkeit" were admirably sung by Laelia Finneberg, who made light of the considerable difficulties of songs which certainly require a musician to sing them.

"Konzertstück"—a large work for violin and piano—was given a fine performance by Max Rostal and the composer. An elaborate and effective piece which could have strained the resources of a violinist less brilliant than Mr. Rostal, who played it with an ease which may well have deceived many of his audience as to the technical demands and arduous of a

work which is modern, yet not too modern, in feeling, compact and thoroughly well constructed and worked out.

The high spot of the concert lay perhaps at the end, in the shape of six studies for two pianos played by Vitya Vronsky and the composer. These studies were but recently composed, and are a delightful and well contrasted set well suited to the brilliant technique of the performers. It is difficult to make a choice between the pieces. If one had a feeling it was for the simple and delicious "Quasi una Siciliana" sandwiched between an astonishing "Veloce" and a "Vivace (Après Rimsky-Korsakoff)" which latter proved to be an arrangement of our old friend, "The Flight of the Bumble Bee." The final "Allegro, molto drammatico," was a "tour de force." Victor Babin's arrangement of Borodin's "Polovstian Dances," played as an encore, was successful in reducing the elaborations and texture of the orchestral piece to terms of two pianos. The agility and brilliance of both artists is amazing, and their ensemble is almost uncanny. It is seldom that one has a feeling of such complete understanding between two pianists.

Victor Babin has just completed a concerto for two pianos and orchestra which will receive its world premiere at a broadcast on Monday, 5 December (National, 8.10).

The audience was large and appreciative. Among the various notables present were Sir George Franckenstein and Mr. Artur Schnabel, under whom Victor Babin has studied.

The concert was in every way one of the most successful social occasions ever held in the Institute.

R. S.

THE DESIGN OF WINDOW OPENINGS FOR EFFICIENCY OF ILLUMINATION

By PERCY V. BURNETT [F.]

From time to time there have been published full details of methods by which the penetration of daylight into buildings can be calculated, and these methods are now well known and widely used. There have also been published the results of enquiries into the intensity of daylight required for special purposes, but there does not appear to have been any particular attention paid to the opposite view, that is the design of buildings so as to provide a sufficiency of daylight in the rooms, having regard to the particular position of the building about to be designed. The various reports that have been published deal with the penetration of daylight into known interiors through known window openings; from the architect's point of view what is required is some simple method of designing window openings and interiors so that there will be sufficient daylight illumination, without an excess that will cause unreasonable heat loss, and it is the purpose of this paper to consider that point of view only, i.e., that of the practising architect, with particular reference to commercial buildings in cities.

Building regulations, almost without exception throughout the country, require the areas of windows to be proportioned to the areas of the rooms served. Whereas such a method may be useful for some purposes, as the size of a room bears no relation whatever to the area of sky to be seen through the windows it is obvious that that method is quite useless as a means of securing a sufficiency of daylight.

It will also be obvious that any simple rules for window opening design can only apply to normal cases, with rooms and light obstructions of reasonable proportions. Exceptional cases must be dealt with on their merits, and the methods recommended must be applied intelligently; but it will be found that in most cases these guiding principles are applicable. The pressing problem is how to obtain sufficient daylight from such unobstructed areas of sky as are still left in our overbuilt cities.

To consider this question it is not necessary to be acquainted with the technicalities of daylight penetration, and the methods now suggested do not require any such knowledge. All that are required for the design of windows of sufficient size to give proper daylight illumination are details of the width of the road upon which the proposed building is to face, the maxi-

mum height to which local building or town-planning regulations will permit the reconstruction of the buildings opposite, and a little simple geometry.

It is always necessary to consider the maximum height to which the buildings opposite could be reconstructed, and not the heights that may exist at the moment, because it will be of little use to design windows for a condition that may be changed at any time. Maximum permissible heights are, in most cities, easily ascertainable.

The sufficiency of daylight within a room depends mainly upon the following facts:—

1. The distance of the opposite building.
2. The height of the opposite building.
3. The depth of the room from the window wall to the back.
4. The height of the floor of the room above ground level.
5. The window.

All these facts control the area of sky that can be seen from various parts of the room, the sky being the only source of daylight which is of any real use; reflecting surfaces give a cheerful impression, but very little else. For this particular purpose it is not necessary to consider the brightness of the sky, hourly or seasonal variations or similar matters, because whatever the sky conditions may be these five factors will continue to control the proportion of available daylight within the rooms.

Nos. 1 and 2 can be ascertained easily. No. 3 will usually be settled by the exigencies of planning, but will be referred to later in this paper. Nos. 4 and 5 are the two points to be decided by the architect, and which are now to be considered.

Before commencing detailed design, the standard of daylight required in the rooms has to be determined, and for this purpose I would suggest three standards, which are explained in Fig. 1; A, direct daylight from the sky penetrating on to a plane 2 ft. 9 in. above floor level for three-quarters of the depth of the room; B, similar but for half the depth of the room; and C, similar but for one-quarter the depth of the room, and I suggest that these standards can be considered as being high, medium and low respectively for a town interior. The standard required should be selected according to the use of the room under consideration;

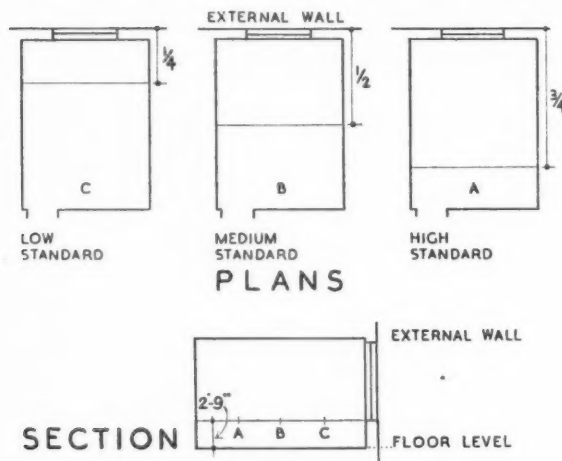


Fig. 1

A would be required for an office containing a large number of typists; B would be suitable for the average living room or an office occupied by one or two persons; C would be sufficient for a waiting room or for a purpose where light is only required close to the window. Such standards of illumination will be obtained if the maximum obstruction to daylight opposite the window is within the line on section made by joining the standard point to the head of the window produced to the opposite side of the road, as shown in Fig. 2.

These standard points, when connected for all visible aspects through the window, are commonly termed "no-sky lines," because behind them no sky can be seen from the table plane, through the window, over the obstructing building. So far as daylight received directly from the sky is concerned, no-sky lines are not the same as the accepted standard of adequacy of daylight (0.2 per cent. daylight factor), but when considering continuous obstructions of regular height, as in this case, and when reflected light from the opposite buildings and within rooms is added to the direct light from the sky, the difference is so small that for this purpose it is negligible. It will be seen that if the height and distance of the building opposite are known, and the standard point decided upon, by setting up the two points on section in relation to one another and joining them by a line, the point where this line strikes the line of the external wall will be the height of the head of the window required.

Fig. 3 is the suggested method of applying these principles. First, the width of the road is drawn in section (1, 2), then the maximum permissible height and contour of the opposite building is set up (2, 3, 4), and then the line of the front wall of the proposed build-

ing is drawn (1, 5). The ground floor level is drawn (6, 7), and 2 ft. 9 ins. above that the table height plane (8, 9). The depth of the room tentatively dictated by planning considerations is then set up (10, 11), after which the standard light point required is marked on the table plane. (12. In this case Standard B being assumed, half-way between points 8 and 9.) From point 12 a line is drawn to the top of the obstructing building (4), which intersects line 1, 5 at point 13, which is the height of the head of the ground floor window required to give that standard of light to a room of the depth chosen. If this point 13 is too high to be practical, then either a lower standard of light must be expected, or alternatively the room as planned is too deep from front to back.

For the next floor the whole process is repeated. Above point 13 mark off a depth sufficient to allow for the usual depth of beam and thickness of floor (14, suggested at 18 ins. above 13), which gives the first floor level. Draw the table plane above that level (15, 16), mark off the standard point (19), connect points 19 and 4, and point 20 is the height of the head of the first floor window. The process is then repeated all up for the number of floors required until the height of the head of the window is not less than 8 ft. above floor level, which is suggested as the minimum height desirable for modern commercial buildings.

From this example it will be seen that when point 4 and the ground floor level are known, the remaining information can be tabulated so as to avoid the neces-

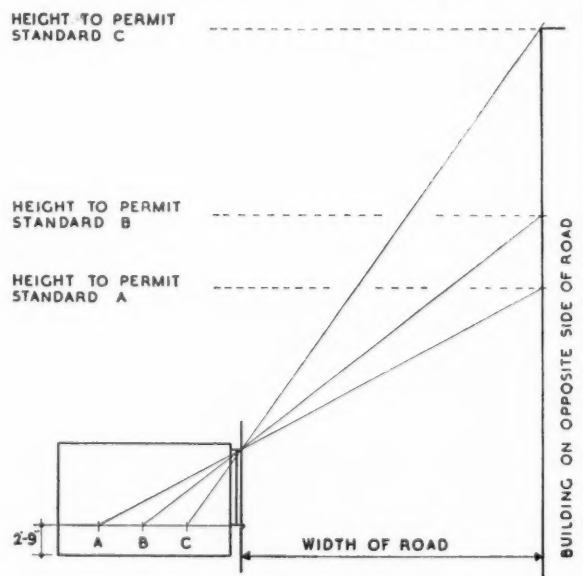


Fig. 2

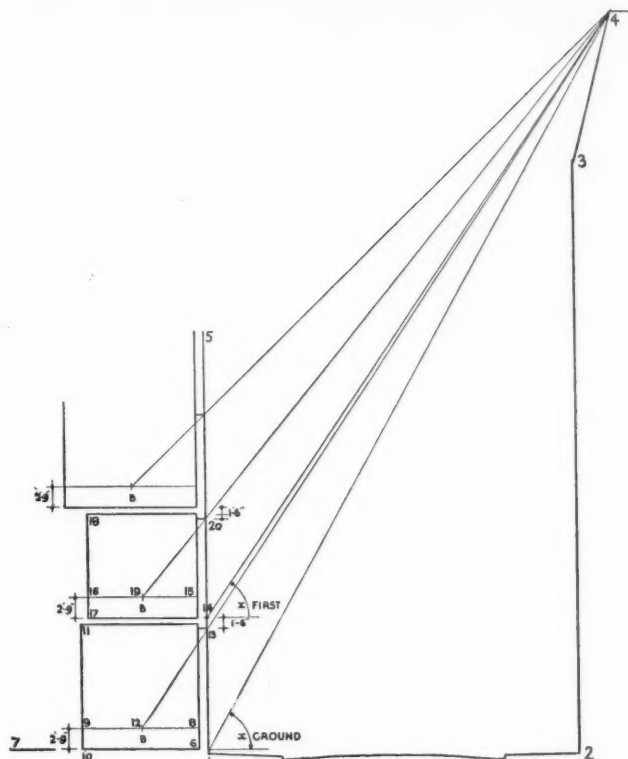


Fig. 3

sity for drawing such sections. For this purpose it is suggested that the position of point 4 should be expressed as an angle from the floor levels (x), and in this way any distance of point 4 from line 1, 5 can be incorporated in the table provided that the height of point 4 remains constant.

The table shown in Fig. 5 is prepared in that way, and the height of point 4 is assumed to be 100 ft. Similar tables could easily be prepared for other heights, according to the local conditions. Heights of window heads are indicated to the nearest inch, heights of window heads over 14 ft. above floor levels not being indicated as being obviously uneconomic, and heights lower than 8 ft. are taken as 8 ft., being the minimum desirable. The angles taken in the example table, 40 deg. to 65 deg., and the depths of rooms, taken as varying from 14 ft. to 20 ft., are the usual limits found in cities.

The use of such a table will be obvious, and if 1 ft. 6 ins. is added to the height of each window head the next floor level is obtained, the angle re-measured, and the process repeated for the number of floors required.

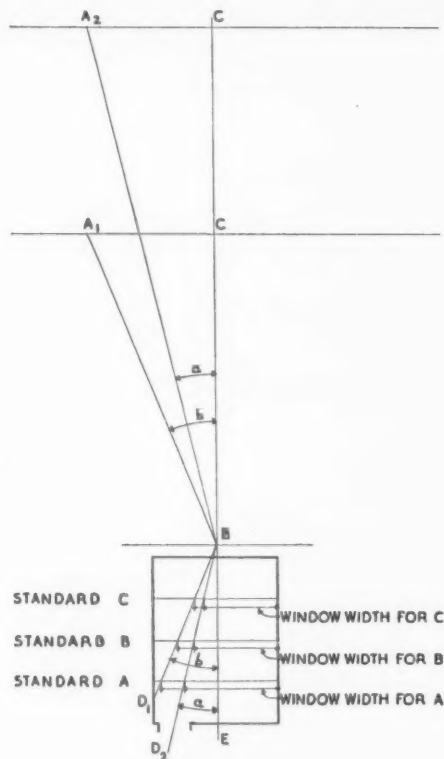


Fig. 4

The window cill height is of less importance, and it makes very little difference in rooms having windows facing other buildings across roads in cities what height the cill is so long as it does not exceed reasonable limits, and in most cases any height between 2 ft. and 4 ft. 6 ins. can be selected to suit the elevational design without affecting the light in the room materially.

The width of the windows will be dictated mainly by elevational design, but the width is just as important as the height, and must be proportioned to the depth of the room, the standard of light required, and the distance away of the obstruction to light. Although it is possible to say that unless a given height of window head above floor level is provided opposite to a given obstruction an undesirably large proportion of the depth of the room will have no visible sky at table height, no equally simple solution is possible as to the width of window required to render visible sufficient unobstructed sky to those portions of a room in front of the "no-sky" line. Unless consideration is given to the lighting values, varying with height, of square feet of glass through which unobstructed sky is visible, on

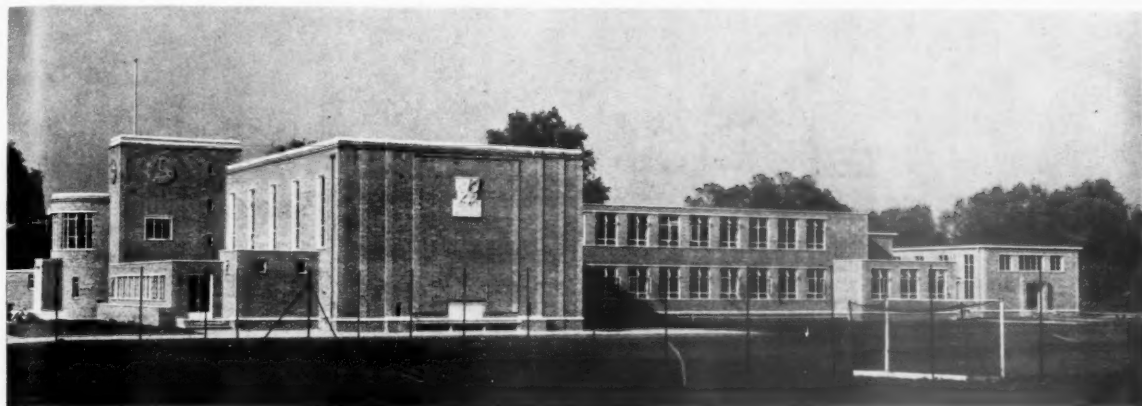
the lines of the system published in Paris last year and reported in the *Builder* of 1 October 1937, this factor can only be determined by rule of thumb and experience.

I have found by experience of rooms in crowded urban districts, of normal proportion such as 4 to 5, or 4 to 6, with windows in the end walls, that the minimum width of window opening (or windows collectively) required for satisfactory illumination is seldom less than one half the width of the room. From this commencement, and bearing in mind that the width of window should vary with the standard of light required, the distance of the obstruction opposite, and the depth of the room being considered, a suggested method of calculating this width is shown in Fig. 4, which will be found to be a useful guide, although not applicable to all rooms and conditions. Set up a plan of the

room to scale, and also the line of the opposite obstruction the proper distance away. In the room mark the line of the standard of light required as explained above, and then the longitudinal centre line of the room produced to strike the line of the opposite obstruction, (C). From point C mark off the width of the room (A) and join up point A to B. Make angle DBE equal to ABC (as a or b) and where line DB intersects the standard line read off the width of the window required between that point and the opposite side of the room. This suggested method gives very wide windows, but varies the width of the window according to the distance of the obstruction, the depth of the room and the standard of light required, and never reduces the width of window to less than one-half of the width of the room.

LIGHT STANDARD	DEPTH of ROOM																	
	14ft			15ft			16ft			17ft			18ft			19ft		
	C	B	A	C	B	A	C	B	A	C	B	A	C	B	A	C	B	A
65°	11'6"			12'3"			12'9"			13'0"			13'3"			14'0"		
64°	11'2"			11'11"			12'5"			12'8"			12'9"			13'6"		
63°	10'10"			11'7"			12'1"			12'4"			12'4"			13'0"		
62°	10'6"			11'3"			11'9"			12'0"			11'10"			12'8"		
61°	10'3"			10'11"			11'5"			11'9"			11'6"			12'4"		
60°	9'11"			10'7"			11'2"			11'5"			11'3"			12'0"		
59°	9'7"			10'4"			10'10"			11'1"			10'11"			11'8"		
58°	9'4"	14'0"		10'1"			10'6"			10'9"			10'8"			11'4"		
57°	9'1"	13'8"		9'10"	14'0"		10'3"			10'5"			10'5"			11'0"		
56°	8'11"	13'4"		9'7"	13'8"		10'0"			10'1"			10'2"			10'8"		
55°	8'8"	13'0"		9'4"	13'4"		9'9"	13'11"		9'11"			9'10"			10'4"		
54°	8'6"	12'8"		9'1"	13'0"		9'6"	13'7"		9'7"			9'7"			10'1"		
53°	8'4"	12'4"		8'10"	12'8"		9'3"	13'3"		9'4"	13'10"		9'4"			9'10"		
52°	8'2"	12'0"		8'7"	12'5"		9'0"	12'11"		9'2"	13'6"		9'2"	14'6"		9'7"		
51°	8'0"	11'8"		8'5"	12'1"		8'9"	12'7"		9'0"	13'2"		8'11"	13'8"		9'4"	14'0"	
50°	8'0"	11'5"		8'3"	11'10"		8'6"	12'4"		8'10"	12'10"		8'9"	13'4"		9'1"	13'8"	
49°	8'0"	11'2"		8'0"	11'6"		8'3"	12'0"		8'8"	12'6"		8'7"	13'0"		8'11"	13'4"	
48°	8'0"	10'11"	13'10"	8'0"	11'2"		8'0"	11'9"		8'6"	12'2"		8'5"	12'8"		8'9"	13'0"	
47°	8'0"	10'8"	13'6"	8'0"	10'11"		8'0"	11'6"		8'4"	11'10"		8'3"	12'4"		8'7"	12'8"	
46°	8'0"	10'5"	13'2"	8'0"	10'8"	13'9"	8'0"	11'3"		8'2"	11'6"		8'1"	12'0"		8'5"	12'4"	
45°	8'0"	10'2"	12'11"	8'0"	10'5"	13'5"	8'0"	11'0"		8'0"	11'3"		8'0"	11'8"		8'3"	12'0"	
44°	8'0"	9'11"	12'7"	8'0"	10'2"	13'1"	8'0"	10'9"	14'0"	8'0"	11'0"		8'0"	11'5"		8'1"	11'9"	
43°	8'0"	9'8"	12'3"	8'0"	9'11"	12'9"	8'0"	10'6"	13'6"	8'0"	10'9"	14'0"	8'0"	11'2"		8'0"	11'6"	
42°	8'0"	9'5"	12'0"	8'0"	9'8"	12'5"	8'0"	10'3"	13'4"	8'0"	10'6"	13'7"	8'0"	10'11"		8'0"	11'3"	
41°	8'0"	9'2"	11'9"	8'0"	9'5"	12'1"	8'0"	10'1"	13'0"	8'0"	10'3"	13'3"	8'0"	10'8"	13'10"	8'0"	11'0"	
40°	8'0"	9'0"	11'6"	8'0"	9'2"	11'10"	8'0"	9'11"	12'6"	8'0"	10'0"	12'11"	8'0"	10'5"	13'6"	8'0"	10'9"	13'9"

Fig. 5



The school from the playing fields

GIRLS' MODERN SCHOOL, BEDFORD

Architect: Oswald P. Milne [F.]

The old Bedford Girls' Modern School in the centre of the town became too cramped for its purpose, and it was necessary to move out and rebuild. The school already owned playing fields on the outskirts of the town, and it was decided to build there; the limitations of the site were chiefly that as much space as possible had to be left as playing fields, and that connection had to be made to the existing East Lodge of Dame Alice House, which is used for teaching domestic subjects, and where kitchens and dining rooms provide midday meals for the girls. This necessary connection was complicated by the stream which runs north and south on the west side of the site, between the playing fields and the grounds of Dame Alice House, and by the fact that the old house fronted right on to the Cardington Road, and it was desired to set the new buildings as far back from the road as possible. It was impossible to plan the new buildings on the west bank of the stream, and the solution decided upon was to link them with the old building by means of a low cloakroom and corridor wing bridging the stream, and thrown back on a curve in order to bring the main building well back from the road.

PLAN

The main girls' entrance is in the cloakroom wing. Their corridor leads round to the assembly hall via the main entrance hall off which opens the passage to the administrative offices and headmistress's room. The classrooms on two floors, facing south-east, link the hall to the laboratory wing and gymnasium and changing-rooms on the north, and the library is placed on the

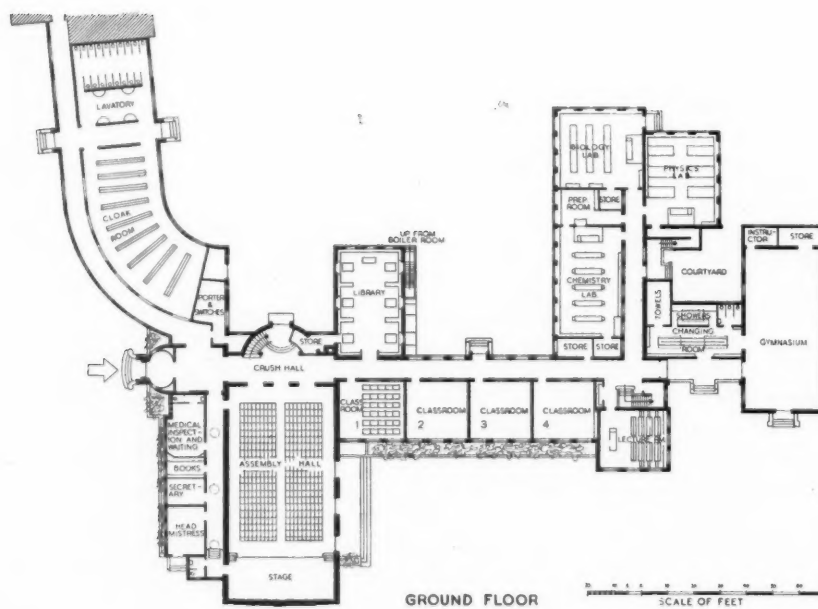
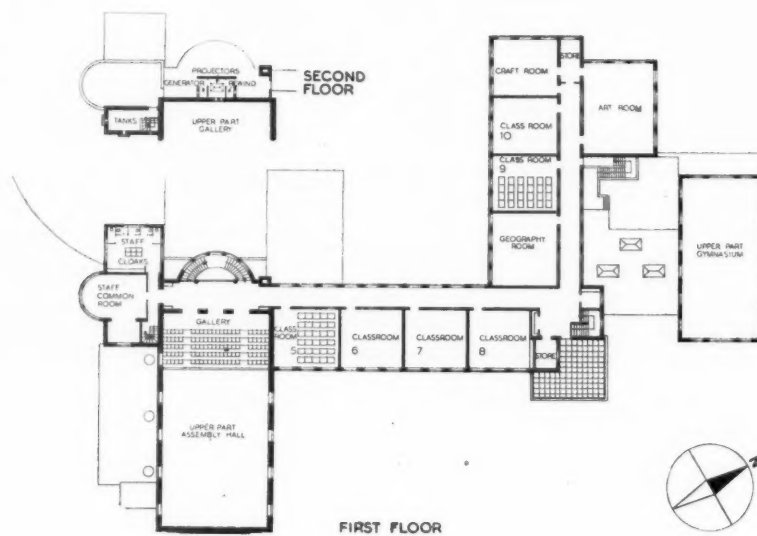
west side of the main circulation corridor, and is lit from three sides. The staff common room is placed over the main entrance, with staff lavatories and cloaks adjoining; over the laboratory wing are two extra classrooms, the geography room, and rooms for arts and crafts. The assembly hall, with a gallery, is equipped with cinema projection apparatus and a stage with proscenium curtains and footlights for theatrical work.

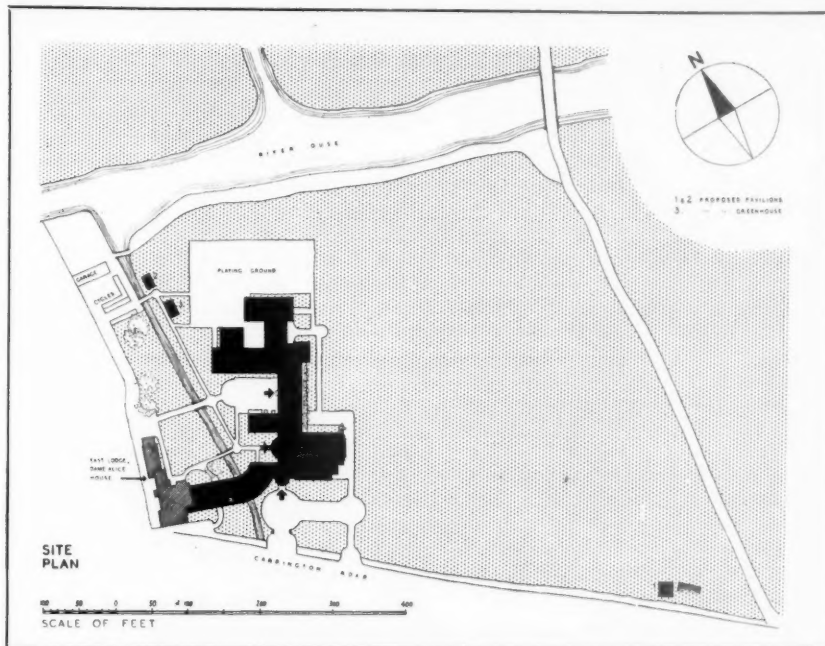
At the moment the school accommodates 350 girls, but extension up to 500 is contemplated. This will be effected by the addition of another floor, the limited size of the site making horizontal extension impossible without seriously interfering with the usefulness of the playing fields.

STRUCTURE AND MATERIALS

The structure is of brick with steel beams and hollow tile floors and roofs. Local multi-coloured facings are used, and reconstructed stone dressings. Internally, except in the library, assembly hall and administrative rooms, the walls are carried out in an unplastered sand lime brick with cream pointing. Corridor floors are cream terrazzo, and classrooms and assembly hall beech block. Tile skirtings are used throughout. Windows are of steel; the internal doors are flush, painted in the classrooms and stained in the corridors.

The classrooms are equipped with cupboards for books and papers; the "blackboards" are green, and a large fibre boarded space provides for the pinning up of maps and pictures. The assembly hall is partly panelled in oak, and an interesting detail is the access to the lighting reflectors in the high ceiling, which is





obtained from the roof, the concrete being turned up round a circular aperture, and a removable teak cover provided.

The buildings throughout are heated by a low pressure heating system. The boilers are coal burning, and are automatically stoked. A separate hot water

system provides hot water to lavatories and shower baths, etc.

The coat of arms panel on the east wall of the assembly hall is by Mr. Esmond Burton.

The cost of the building, including paths and ground-work, was approximately £43,000.

CONTRACTORS AND SUPPLIERS

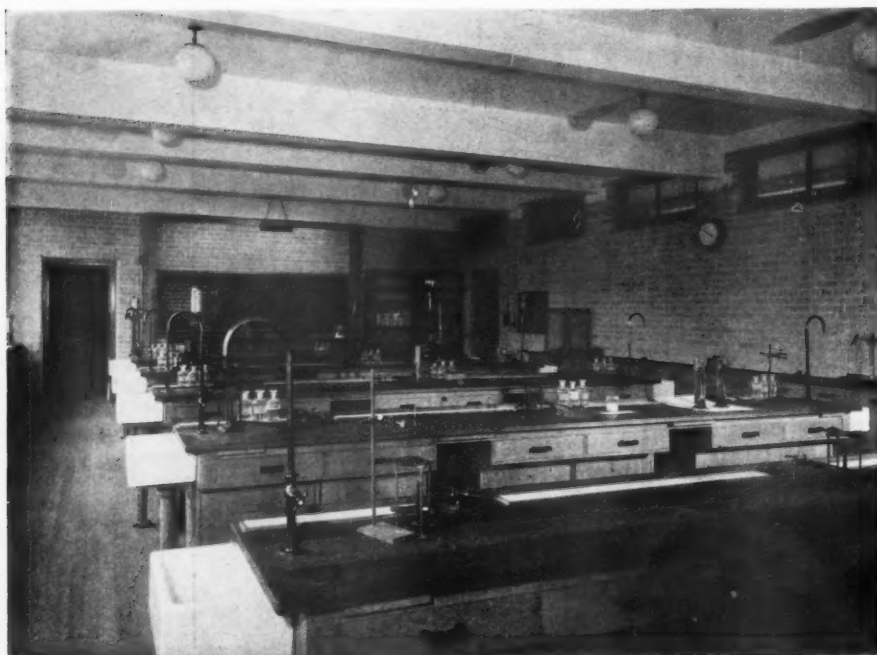
GENERAL CONTRACTORS:

Messrs. Samuel Foster, Ltd. (Kempston).

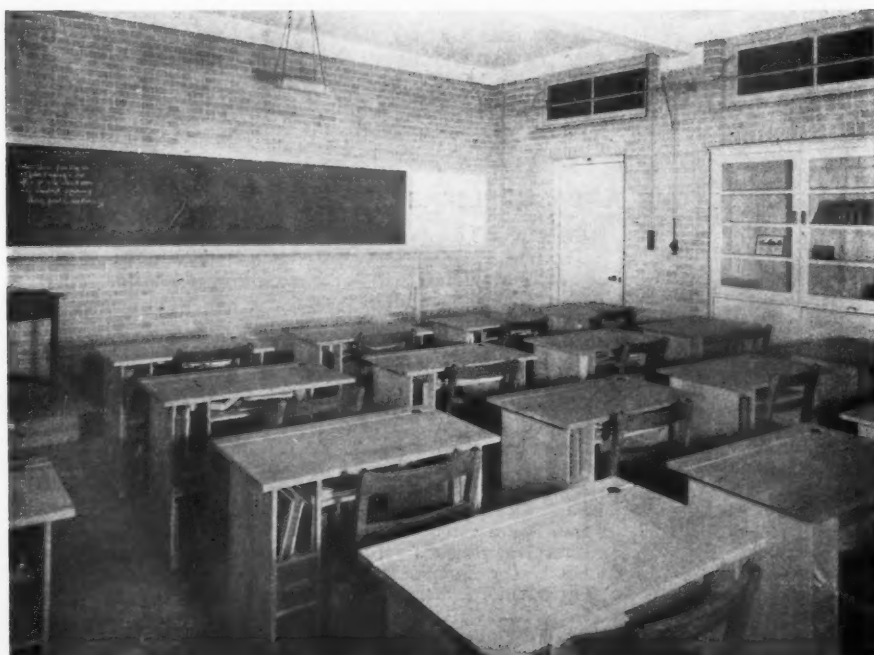
SUB-CONTRACTORS AND SUPPLIERS:

Heating and Hot Water	Messrs. Henry Bacchus, Ltd.
Electrical Work	Messrs. Tyler & Freeman.
R.C. Bridges and Boiler	Messrs. Liversedge Reinforce-
House Structure	ment Co., Ltd.
Steelwork	Messrs. Aston Construction Co.
Hollow Tile Floors	Messrs. Diespeker, Ltd.
Metal Windows	Messrs. Williams & Williams.
Artificial Stonework	Messrs. Croft Granite Co.
Franklins Facing Bricks	
Grovebury Sand Lime	Messrs. Herbert & Co.
Bricks	
Patent 3-Ply Roofing and	
'Aqualite' Sheeting	Messrs. William Briggs.
Wood Block and Strip	
Flooring	Messrs. Hollis Brothers.
Sanitary Fittings	Messrs. Adamsez and Messrs.
	William Farrer.

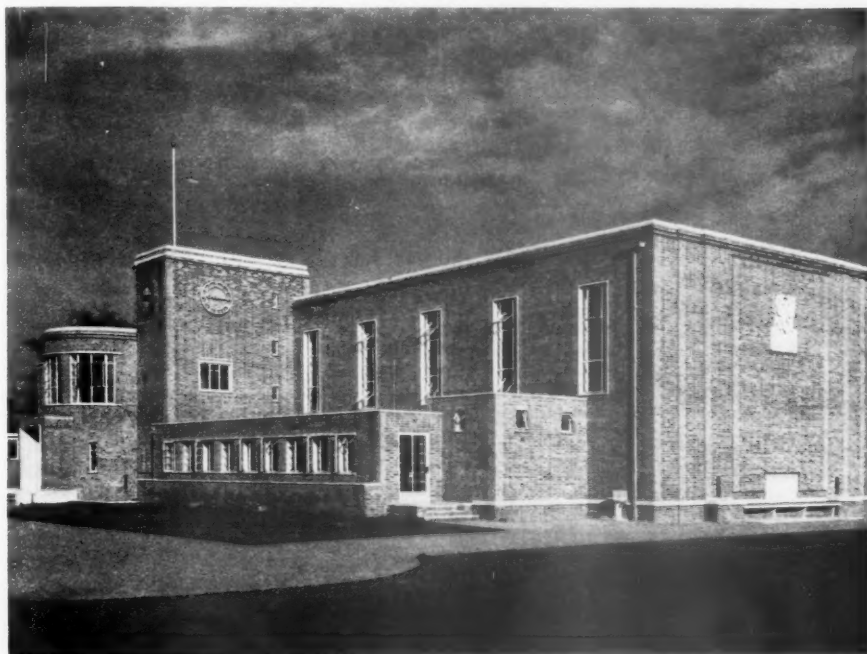
Cloakroom Fittings	Messrs. Potter Rax.
Terrazzo Flooring Decor-	
ative Motif in Floor	Messrs. Walter Jenkins.
Hall Panelling, Library	
Fittings and Wood	
Carving	Messrs. J. P. White & Sons.
Ironmongery	Messrs. Comyn Ching.
Clock Movement and Hands	Messrs. Everett Edgcumbe.
Clock Faces	Messrs. Tucker & Edgar.
Flagstaff and Lightning	
Conductor	Messrs. J. W. Gray.
Wall and Floor Tiling	Messrs. A. J. Tatham.
Dome Lights	Messrs. Haywards.
Flush Doors	Messrs. Ace Laminated Products
Iron Railings to Stairs, etc.	Messrs. Gascoignes.
Rain Water Heads	Messrs. O'Brien Thomas.
Laboratory Equipment	Messrs. Griffin & Tatlock.
Ornamental Entrance Gates	Messrs. William Pickford.
Cycle Racks	Messrs. Constructors, Ltd.
Fibrous Plaster Decoration	Messrs. Plaster Decoration Co.,
	Ltd.



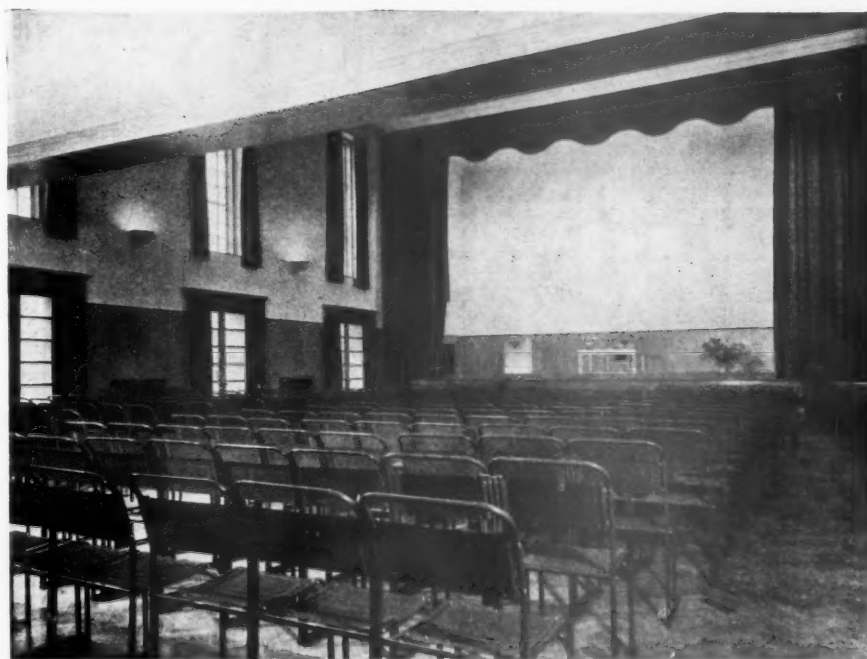
The chemistry laboratory



A classroom



The main entrance, from the south, showing the administration block in the foreground



The assembly hall

REVIEW OF CONSTRUCTION AND MATERIALS

This series is compiled from all sources contributing technical information of use to architects. These sources are principally the many research bodies, both official and industrial, individual experts and the R.I.B.A. Science Standing Committee. Every effort is made to ensure that the information given shall be as accurate and authoritative as possible. Questions are invited from readers on matters covered by this section; they should be addressed to the Technical Editor. The following are addresses and telephone numbers which are likely to be of use to those members seeking technical information. There are many other bodies dealing with specialised branches of research whose addresses can be obtained from the Technical Editor. We would remind readers that these bodies exist for the service of Architects and the Building Industry and are always pleased to answer enquiries.

The Director, The Building Research Station, Garston, Nr. Watford, Herts. Telegrams: "Research Phone Watford." Office hours, 9.30 to 5.30. Saturdays 9 to 12.30.

The Director, The Forest Products Research Laboratory, Princes Risborough, Bucks. Telephone: Princes Risborough 101. Telegrams: "Timberlab Princes Risborough." Office hours, 9.15 to 5.30. Saturdays 9.15 to 12.

The Director, The British Standards Institution, 28 Victoria Street, London, S.W.1. Telephone: Victoria 3127 and 3128. Telegrams: "Standards Souest London." Office hours, 9.30 to 5. Saturdays 9.30 to 12.30.

The Technical Manager, The Building Centre, Ltd., 158 New Bond Street, London, W.1. Telephone: Regent 2701, 2705. Office hours, 10 to 6. Saturdays 10 to 1.

The Chief Technical Officer, The Building Centre (Scotland) Ltd., 425-7 Sauchiehall Street, Glasgow, C.2. Telephone: Douglas 0372-0373. Office hours, 9.30 to 6. Saturdays 9.30 to 1.

THE FIRE-TESTING STATION

The Science Committee held their first official visit to the Fire-Testing Station at Elstree on 24 November. The party was received by Mr. W. H. Tuckey, Chief Technical Officer of the Fire Offices Committee, and by members of the research staff. The Station* has been built and is operated by the Fire Offices Committee and the research work on structural elements is under the control of the Building Research Board. A test on the fire resistance of a reinforced concrete column was in progress, was concluded while the party was present and proved of great interest.

The conditions and methods of test are interesting and practical. There are three furnaces, one each for floors, walls and columns. They are gas-fired and have been found in practice to give remarkably close temperature control. All tests are according to B.S. Specification No. 476, which lays down four major conditions of test as follows:—(1) The erection of structures to a specified size and their conditioning; (2) the heating of the structure whilst under load according to a specified time-temperature curve; (3) the application, in the case of all structures which in service carry a load, of one and a half times the design load; (4) the subjection of certain structures to a water test at the end of the heating period.

The structures tested are graded for resistance as follows:—Grade A, 6 hours; Grade B, 4 hours; Grade C, 2 hours; Grade D, 1 hour; Grade E, $\frac{1}{2}$ hour. Each type of structural element has also to satisfy certain conditions such as the non-passage of flame in the case of walls and the ability to carry load in the case of elements normally load-bearing.

The reinforced concrete column seen under test was an example fairly typical of ordinary practice. The specimen was about 12 inches square and some 10 to 12 feet high. The aggregate was ballast and the steel had a cover of $1\frac{1}{2}$ inches. It was loaded to 760 lbs. per square inch.

The structural member is held in compression in an Amsler hydraulic press, the head and foot being held by heavily insulated concrete pads. The rams of the press are arranged on two opposite sides of the member. The two remaining sides are occupied by semi-cylindrical steel and fireclay half

furnaces, the gas burners discharging through the centres of the fireclay lining blocks in a regular pattern. These two semi-cylindrical units are mounted on tracks and have flexible connections for gas and air. They can be brought together so as to enclose the specimen entirely, fitting closely with the pads at the top and bottom. At the conclusion of the test the gas is turned off, the two halves of the furnace rolled away and a heavy water jet is played on the specimen from a distance of 20 feet.

The column under test failed towards the end of the second hour. Quite early in the test the concrete cracked, and towards the end the steel reinforcement became partially exposed. On the furnace being opened and the water jet applied (an exciting spectacle) large pieces of the outer covering of concrete flaked off, in the end exposing the reinforcement almost completely. According to the B.S. Specification time-temperature curve, the temperature of the furnace at the end of the two hours was about 1,000 degrees Centigrade.

Although the Station has been in existence exactly two years it is not likely that results leading to a review of building regulations and practice will be published for some time. Nevertheless, a bulletin of interim results may be published this year. A certain amount of information has already been published in the Annual Report of the Building Research Board for 1937 (pp. 106-113). This is well worth studying by those interested in fire-testing research.

This published matter brings out one rather startling fact, namely, that in general the fire resistance of the pugged wooden-joisted floor is as high as that of the rod-reinforced concrete slab floor and may even be higher. Wooden floors pugged with ashes and foamed slag concrete and without pugging stood up for periods ranging from 24 to 53 minutes. Unplastered specimens of reinforced concrete slab floors withstood only $\frac{1}{2}$ to 1 hour exposure. The plastered specimens of concrete floor lasted longer, but insufficient data has as yet been obtained to determine the full effects of different plasters and different keys. In the general remarks on concrete it can be observed that brick aggregates lasted much longer than gravel aggregates, which were mainly of the Thames ballast type, the latter showing a tendency to spall off, sometimes with explosive violence.

* The Station was illustrated and described in the R.I.B.A. JOURNAL of 7 December 1935 at the time when it was opened by H.R.H. the Duke of Kent.

As a result of the tests on wooden joisted floors, a special floor of this type was designed and actually endured for 1 hour 42 minutes. It consisted of 9 in. by 2 in. joists covered on top with $\frac{7}{8}$ inch T. & G. boarding. The soffit was also boarded and carried 3 inches of foamed-slag concrete, mixed 1:3:9, and placed between the joists. Below this soffit boarding were battens at 14 inch centres to which in turn were nailed laths covered with three coats of retarded hemi-hydrate plaster.

Filler joist and hollow-tile floors appear to have given somewhat equal results. In simply supported examples, the former all endured more than 4 hours' exposure but deflected badly; the latter survived from $2\frac{1}{2}$ to $3\frac{1}{2}$ hours. Restrained floors, that is to say rigidly held in a frame, lasted much shorter periods than the simply supported examples. Two reinforced concrete slabs of gravel aggregate, restrained in a frame, failed at 42 minutes and 31 minutes respectively.

Steelwork encased with 2 inches of concrete lasted well, but it was not easy to say when failure of the steelwork actually occurred. The casual wrapping of wire mesh round the steel

member was found to be far less effective than its careful placing at one inch distance from the face of the concrete covering. An unprotected steel specimen buckled severely after 40 minutes.

The foregoing tests cannot be taken as finally conclusive. They will have to be closely correlated with a large number of tests made since the Report was written and still remaining to be made. But they indicate quite clearly that ideas on fire resistance which have hitherto governed practice and regulations will have to be drastically revised. For instance, the R.I.B.A. party were informed that there appears to be no special virtue in teak as a fire-resisting material for doors, the resistance of such doors depending rather on other factors, such as thickness.

The work now proceeding at the Fire-Testing Station is of first-class importance to the building industry. Of even greater importance is the fact that the new Model Byelaws have been framed to allow incorporation and therefore application of information obtained by research such as this.

ZINC AND ITS USES

For a good many years now, zinc has been under rather a cloud, and this for no really justifiable reason. To the present generation it is little more than a cheap substitute for copper or lead, and this in spite of the fact that it is very widely used on the Continent for covering flat roofs and mansards, as well as for rain-water gutters and downpipes.

As a material, zinc ranks as one of the big three of the non-ferrous group, world production being about the same as that of lead with about a million and a half tons per annum, some way behind copper with two million, but a long way ahead of the next material, aluminium, the production of which is only about half a million tons, though the low specific gravity of aluminium brings the figures closer if they are looked at from the point of view of actual work produced.

The reason for the temporary eclipse of zinc is very largely the old story of price-cutting and unskilled labour, for there is no real doubt that, given good workmanship and an adequate thickness of sheet, the life of a zinc roof may be upwards of forty years. The roof of Snow Hill Station in Birmingham, for example, is still sound after fifty years, and this in spite of an exceptionally polluted atmosphere both inside and out. The proper life of buildings is doubtless a somewhat debatable point, and while few would go as far as a recent American pronouncement which condemns as a traitor to his profession any architect who designs a building to last more than ten years, it would appear, from the rate at which London is now being pulled down, that a life of forty years should be long enough.

On these grounds one may assume that zinc is worth further investigation, and it is here that the trouble starts, for it is either ignored or dismissed in a few lines in most of the textbooks on construction. Hence the fairly recently formed Zinc Development Association, which has been formed to conduct general propaganda for zinc, and to prepare booklets on its proper use. The first booklet* has been out for some time, and, very naturally, it is no more than a general survey to be amplified in due course. The second,† which is comparatively new, deals with roll cap roofing. Here the gauge

recommended is 14 or over, and it is worth noting that zinc gauges go the opposite way to the normal standard wire gauge, the numbers getting bigger as the thickness increases, 14 gauge being the approximate equivalent of 21 standard wire gauge.

The actual technique of zinc roof laying is adequately covered by drawings showing capping and holding down clips, welted and beaded drips, stops, and saddle pieces, and there are some useful notes on the proper arrangement of the roof boarding. Like most of the metallic roofings, zinc forms its own protective coating, a basic zinc carbonate which has the same coefficient of expansion as the material itself, and which, therefore, does not tend to peel off with changes in temperature. Near the sea its resistance to corrosion is good, examples being quoted of several seaside piers where it has been successfully used, while it is also worth while remembering that galvanising is almost a standard finish for ship work.

One other point seems worth noting. It is a fairly popular superstition that (to quote from the booklet) "zinc roofs can be destroyed by cats." With masterly reticence, the booklet suggests that "cats, on the whole, are clean animals, and it is very doubtful if the average cat has such a liking for zinc roofs that it will use them in preference to gardens." Any architect who is also a gardener knows only too well that cats, for the discharge of their natural functions, invariably choose the softest part of the most recently planted seed bed, and it is therefore unlikely that they would choose a comparatively unyielding metal roof, so it may be assumed that the argument put forward by the zinc interests is a comparatively reasonable one. We understand, unofficially, that a certain amount of research work has been done on this subject, but that it has been limited by a concerted policy of non-co-operation on the part of the cats. Such information as has been obtained, however, goes to show that this fear is unfounded.

* *Zinc: Its Manufacture and Uses.*

† *Zinc: Roll Cap Roofing.*

Both issued by the Zinc Development Association, Great Westminster House, Horseferry Road, London, S.W.1.

Book Reviews

PROFESSOR REILLY'S AUTOBIOGRAPHY*

It is characteristic of Professor Reilly that he should write an autobiography, not because, like many others that have done likewise, he might be incorrectly represented by some inappreciative biographer, but just because the things he wished to say are peculiarly intimate.

Scaffolding in the Sky, the very apt title which he gives to his work, is a fascinating, readable and amusing book. It is not the autobiography of a professor discoursing in measured terms, and in carefully considered language, upon his rise to fame through the libraries, lecture halls, board rooms and council chambers of a university, nor is it a story of the result of prolonged research through previously unfolded pages of history, occasionally savoured with some appetising disagreement with fellow-professors. Nor yet is it a *Mein Kampf* dilating upon the troubles of disappointed parents, surprisingly early successes, and final achievements in brick and stone.

The interest in Reilly's work lies not in any such sartorial directions: its impelling attraction depends not so much upon the importance of the information imparted, which is perhaps a little too incidental, but upon the ingenuous and even unconscious way in which he reveals himself as a champion of reform in every phase of the Arts.

Reilly, as he informs us at the commencement of his book, comes of an enterprising branch of a very Irish family and like all Irishmen, without counting the cost, he rushes to the fray. It is perhaps this, in a world of deliberation and hesitation, that has made him the notorious and even, at times, the strange professor that he is.

The methods of most writers who seek the plaudits of their audiences are to attack, but Reilly's methods are more courageous, and turn rather to popularising the unknown, to assisting the weak, and even at the risk of losing caste, to range himself along with the group that is despised. So successful has he been in discovering hidden talent and in bringing out untried genius that he could well be described as a king-maker amongst artists.

Perhaps it would be safe to say that no living professor and no living architect is better known to more people than Professor Reilly, and the enormous success of his school, due entirely to his consistent energy and progressive methods, has resulted through the agency of innumerable successful students in the adornment of every town of importance in this country, and indeed throughout the British Empire, with examples of modern architecture which will remain landmarks of a great movement that has come to stay.

* *Scaffolding in the Sky*. By C. H. Reilly. 4to. xiv+352pp.+5 plates. London: Routledge, 1938. 12s. 6d.

Reilly, as is reflected in every page of his book, is as open-minded as he is sincere. Always attracted to the lime-light, he is ever on a stage from which there is no escape amongst the crowd. His philanderings with the fair sex would to some men have been a subject of reservation, but not so with Reilly. Any reference he makes to matters which many would regard as unsuitable for publication he gilds and paints in a way that convinces you that everything is beautiful and that you have nothing to fear.

Describing his friend Doonie, he says: "*She lived with her husband in a disused Gothic school building in a small street next and parallel to Rodney Street in the centre of the town. At one side of the building was a bell turret with a circular stone stair and a forbidding door under a pointed arch at its foot. This door had the exciting word 'Girls' carved in the stone work above it, meaning it had been the entrance for the girls to their schoolroom on the top floor, which was now Doonie and her husband's studio. If one wanted them one shouted 'Doonie' in the street below and after a little while Doonie's head would appear high up framed in the tracery of a circular window. If she liked you she would disappear and in a little while open the door in the street and take you by the hand up the dark circular stair. If she didn't she just withdrew for good.*"

In his married life he has indeed been fortunate. Mrs. Reilly is as understanding as he is impetuous and has throughout a long string of flirtations and infatuations always remained his wife.

So much for Reilly the man, as revealed to us in the pages of his memoirs.

As a practising architect he was perhaps too imaginative and too much of an eclectic to be a great success. As he says himself, in his early days he was greatly influenced by such men as Beresford Pite, who assisted the late John Belcher in his competitive design for the South Kensington Museum, and who is presumed to have been responsible for the design of the Chartered Accountants' building in the City.

He also came under the influence of that only really Baroque architect that England has ever produced—the late Edwin Rickards, whose marvellous ability to draw with the subtle splendour of a double curve fascinated every draughtsman and architect of his period.

His early association with the late Stanley Peach gave him his opportunity for converting into brick and stone a profundity of ideas; but his ambition carried him away from power stations, warehouses and chimneys and led him to attempt the winning of competitions for the Liverpool Cathedral and the London County Hall.

In each, if not successful, he at any rate showed a remarkable ability for compiling a mass of ideas.

His design for the Liverpool Cathedral was at that time considered to be a bold departure from the Gothic tradition and his County Hall was insufficiently sympathetic to the strength and weakness of the late Norman Shaw.

There is no doubt, however, that his design for the Liverpool Cathedral was largely responsible for his appointment to the Chair of Architecture in Liverpool, though he tells us himself that the Selection Committee were more impressed with the chimneys he designed for Stanley Peach.

Once installed, the attention he devoted to the organisation of his very successful school, and this in a provincial town, absorbed his entire energy for many years.

Only his students can speak of his abilities as a lecturer, though it is well known that he is a very persuasive orator. But it is as a professor and organiser that he is best known. Had he lived in the time of Louis XIV he would have made an excellent Le Brun, for his ability for collecting lecturers and visitors, and for impressing his progressive and at times revolutionary ideas upon such staid personalities as the then implacable Vice-Chancellor, as well as at the same time influencing the educational authorities at the R.I.B.A., was remarkable.

Early associates in Liverpool were John the painter, whose portraits of famous Liverpoolians are well known, and Gerald Choune, later killed in the War. A little group of painters and sculptors, collected together by Reilly, occupied the Sandon Studios, and worked in close association with his school.

In the university itself, he soon succumbed to the influence of Professor Mackay, the terror of the University Council and leader of every reform; of the philosopher, Professor Mair; and others who formed themselves into the New Testament group. It was Reilly who held them together. His picture of the great Mackay holding forth at a faculty meeting is particularly characteristic of Reilly's introspective and vivid writing:—

"John Macdonald Mackay was a leader under whom anyone would be proud to serve. No man held more tenaciously to his ideals or seemed to see more clearly each step that must be taken to attain them. It was always a surprise and a delight to notice the way in which each small and often innocent proposal at Faculty or Senate meeting would be tested by him by first principles. Was it for the real spiritual good of the University or the Faculty as a whole or merely for the glorification of one section of it? If we agreed to such and such a step now, would it tie our hands later on in some more useful action? Any question might give occasion for a speech of a mounting, rather broken, eloquence, which seemed as one listened to be for ever taking one to higher and higher planes of thought, to be continually breaking as it were into a new and finer sky."

As well as the rich shipowners and business men, he attracted the then rapidly rising Mr. Lever, later Lord Leverhulme, and it was Reilly who on a Sunday afternoon walk in his garden persuaded him to present to the University of Liverpool costs which had been extracted from the Northcliffe Press in a law suit amounting to £90,000.

Moreover, it was Reilly, with his persuasive ability and Irish enthusiasm, who obtained through Lord Leverhulme that splendid building in the centre of the town now known as Liberty Buildings, but once the Blue Coat School.

Reilly seemed to be able to get whatever he wanted for the asking, but perhaps his greatest and most difficult task was the founding of the Repertory Theatre.

At that time the more correct members of the university looked a little askance, but one by one began to realise that the educational advantages of the stage were not so far

removed from those of the lecture room as previous generations have assumed. Once got going, Reilly was the heart and soul of the venture. It was he who, with the assistance of some of the more progressive members of the university, Ramsay Muir and Oliver Elton; business men and the editors of the leading dailies; Miss Horniman; such theatrical stars as Granville Barker and Sir Nigel Playfair; and a host of others may take the credit of having founded the most important Repertory Theatre in England. All this absorbed much of Reilly's energy, for not only did he beg, borrow and steal, but all the time, with the help of his charming wife, entertained patrons, actors and actresses in his quaint little late Victorian house, Dingle Bank.

The third period in Reilly's career is connected with domestic troubles—the failing health of his wife, sudden death of his little daughter Johanna, and the loss by fire of all his treasures at Dingle Bank. These he endured with singular patience, removing to a town house, in the centre of Liverpool, where in a large room with arched ceiling, on a first floor, he continued to entertain innumerable guests. On his retirement from the university, he went to live at Brighton to be near his wife, whose health required a southern climate and sea air, and here, with the constant interest of a brilliant son and a beautiful married daughter, he has been able to indulge to the full yet another phase of his remarkable versatility. As this book shows, he is an attractive writer. He is not a humorist, trained to produce amusing references to the commonalities of life. His sense of humour is alive and bubbling over, his interests as a writer are always surprising and his references to people and things amazingly improper yet never scurrilous, always sympathetic and always courageous. But perhaps he is at his best in his pictorial descriptions. Who could write as he did in the *Manchester Guardian* of his arrival at Bombay, when on a visit to India with Sir Edwin Lutyens? One only wishes that his information was as reliable as are his descriptions interesting. His facts are gathered from any source: would that we could believe, as he did, that the taxi-cab driver in Oslo who told him that there were no murders in Norway was correct.

The book is not only an inspiration to young architects but is an invaluable reference to the architectural movements that took place during the commencement of the present century. Its references to personalities that have figured in the theatrical world during that period, together with its magnetic method of holding the reader, should recommend it to everyone of whatever taste.

PROFESSOR REILLY AND THE REGISTRATION ACT

We are, of course, very grateful to Professor Reilly for the help which he gave so readily and so enthusiastically in the campaign for the Registration Act of 1931. But in the interests of historical accuracy I am bound to warn readers that the account of the proceedings in the House of Commons which appears on pages 299 to 302 has very little relation to the facts. It would seem that Professor Reilly did not quite grasp what was going on and it is natural, after an interval of seven years, that the memory of whispered conversations during a debate in the House of Commons should be rather vague. So far from being ready to accept the amendment to which Professor Reilly refers we should have been compelled to withdraw the Bill if there had been any danger of its being put into the Act. An amending Bill to deal with that particular matter would have been quite out of the question and we were thoroughly aware of it.

Incidentally the actual originator of the maintenance scholarship scheme was Alderman G. P. Blizard, J.P.

I. M.

TOWN PLANNING AND HOUSING IN THE STATES

CITY LIFE

URBAN SOCIOLOGY. By E. E. Munz. 4to. xvi+742 pp. New York: Macmillan, 1938. 16s.

To the student of architecture this is a book which connects his professional interests with local government administration. It is a compilation of information gathered from both Europe and America, dealing with such subjects as City Planning, Housing, Public Health and Safety, Education and Recreation.

The author dwells at great length upon the origins of urban existence and classifies cities under the following heads: Defence Cities; Cities for Commerce and Trade; Cities for Industry and Production; Political Cities; Religious Centres; Educational Centres; and Resorts for Health and Education.

Probably this is a useful classification, but one less superficial and resulting more directly from an analysis of the variations that have taken place in the organisation of cities due to variations in location and departures in social development might have been more convincing.

As an American explaining the causes which have influenced the growth of cities, he deals at great length with the factor of immigration, and amongst much information backed by a wide research into statistics, he says: "Of all immigrant groups the Jews are the most completely urbanised people. In New York City alone 1,765,000 of the nation's 4,228,029 Jews reside. Indeed, the Jewish population of New York is as great as the combined Jewish populations of Germany, Great Britain, South America, Holland, Belgium, France, Italy, Switzerland, Canada and Palestine. That the Jewish group tends to concentrate in the larger cities is evident from the preponderance in New York City.

In cities of 100,000 and more residents, Jews constituted about 11 per cent. of the population in 1927. In cities ranging from 100,000 to 50,000 population the average proportion of Jewish inhabitants declines quite evenly from 3.3 per cent. for the larger cities to 2.4 per cent. for the smaller cities of this group. In general the relative proportion of Jewish inhabitants to the total population varies directly with the size of the city, declining to less than 1 per cent. in the smaller cities and villages.

An important section of the work is devoted to Housing, and he gives us a vast amount of information concerning slums, preventive and remedial measures adopted by the more important and progressive of municipalities for their eradication. He tells us all about what has been done in Liverpool, London and New York.

Very little is said about town and country planning, but perhaps this development of a subject which is presumed to be confined to the improvement of the city is a little too wide of the mark. But at the same time he recounts the story, as have many authors before him, of how Letchworth, Bournville and Port Sunlight were born.

The subjects under review will certainly be of greater interest to members of municipal councils and social reformers than to architects as such, covering so wide a field as to touch upon Bathing Beaches, Girl Guides, Adult Education, Pure Food, Accident and Insurance. Indeed, so much ground is covered as to make the book more useful for reference than

information. And whilst the information imparted is frequently too scanty and too general to be of use to the practitioner, at the same time it is a book which should have a place on the shelves of all interested in social reform.

S. D. ADSHEAD [F.]

AMERICAN HOUSING

HOUSING COMES OF AGE. By Michael W. Straus and Talbot Wegg. 8vo. 260 pp. + 12 plates. New York: Oxford University Press, 1938. 10s. 6d.

Up till 1933 no large-scale attempt had been made to solve the housing problem in America, and when in that year the Government acted, the primary object of the emergency campaign was not to provide homes but to relieve unemployment.

Housing Comes of Age gives in an extremely lively and readable way the history of the first programme of the Housing Division, a semi-autonomous organisation set up by the Public Works Administration, and of the four years of intensive and frequently discouraging work undertaken. Nation-wide surveys gave the nature and extent of the problem, and statistics of disease, death and delinquency showed just how much it cost the ratepayers to support municipal decay. The Housing Division stressed from the beginning the importance of large-scale development of the "complete community" or neighbourhood, both from the point of view of the life of the town and as a saving in municipal expenditure. After extensive research standards for site planning, social amenities and the unit dwelling were established. For example, 30 per cent. only of the site may be built on except in New York. The standards of services and equipment, based on the economy of large-scale buying, would make even a Scandinavian pause with interest.

Difficulties of land acquisition, criticism and obstruction caused by vested interests are illustrated with spirited examples. Details of legal, technical and administrative organisation are given, and there is an analysis of the P.W.A. projects. The life in the new housing groups is described: the tenants form their own associations and themselves take the initiative in the development of the community. This is a quotation from the residents' newspaper of one community:—

"Apathetic people don't make successes of experiments in workers' housing. It is obvious that we cannot afford to be apathetic. For our community is not merely a new-fangled housing scheme benevolently bestowed by an alleged friendly Government. The social, intellectual, and even political potentialities of such a community as ours are enormous, and, if they are properly developed, the power and prestige of the Labour movement will be greatly enhanced. . . ."

For the architect it would have been interesting to have details of layout and unit plans, and now that the emergency rush is over perhaps there will be further experiment into the possibilities of new materials and types of construction. But as a record of what can be achieved in a short time by centralised initiative and research financed by the State the authors have made an important contribution to housing in all countries.

M. CROWLEY [A.]

HISTORY AND COMMENTARY

MALICE AFORETHOUGHT

PILLAR TO POST. By Osbert Lancaster. 4to. 82 pp. London : Murray, 1938. 5s.

Mr. Lancaster's clever and rather cynical little book is his second contribution to that series of intellectual whimsies of which Mr. Betjeman's *Ghastly Good Taste* was an early and endearing example. It shows a tendency which is beginning to invade the other arts (Nicholas Bentley's "Balletto" springs to mind), the architectural version of which may instantly be recognised by the fact that the illustrations are inevitably drawn with a wobbly and apparently ingenuous line.

In this case the result is highly successful; the author follows the unrolling panorama of architecture from Stonehenge to Highpoint with a sharp, malicious humour, pinning down, as it were, under glass, a sample of each period for our inspection with a wily and deceptively child-like simplicity. His exposition of the subtle shades of development in twentieth century building from the heart-pierced shutters of Art Nouveau by way of Wimbledon Transitional to Bye-Pass Variegated is monumental and depressing.

Each drawing is accompanied by a pithy and sometimes brilliant survey, not infrequently enlivened by the personal prejudices which the author freely admits. These prejudices are the less reprehensible and the more amusing because they are those which most of us harbour.

In his foreword, however, Mr. Lancaster falls into the trap which has ensnared so many English writers since the middle of the last century—that of endeavouring to combine the amusing with the instructive. He bases this endeavour on two fallacies, first, that the ordinary man in the street knows nothing about architecture, never notices the examples by which he is surrounded, and therefore expresses no opinion on the subject, and second, that all the evils of present-day architecture arise from this ignorance and silence. With regard to the first, it is difficult to see how this fallacy has arisen. There is hardly a citizen who has never in his life definitely laid down the type of architecture he prefers and equally definitely expressed his dislike of one or other of the public buildings provided for him by an harassed profession. It is true that these likes and dislikes rarely coincide with the most advanced contemporary architectural thought—but then neither do the buildings in our streets.

With regard to the second fallacy, let Mr. Lancaster honestly try to indicate exactly which architecture he would like to see taught to the public: commercial Georgian, banker's Georgian, advanced or Swedish refined Georgian, or the 57 different varieties of modern ranging from the new Adelphi to Bexhill Pavilion. The point is, of course, that architecture is not the absolute idea beloved of the intellectual; it is the synthesis of economic needs and social ideas of a period with the existing structural means. In other words society gets the buildings it deserves and wants.

This fallacy gives rise to the only obvious mistake in the book, which is the amusing but entirely inaccurate parallel drawn by the author between Nazi and Soviet Russian architecture. In point of fact public opinion in the U.S.S.R. has long since repudiated the early ideas of abolishing decoration and the people, feeling for the first time the exhilaration of their new prosperity, are demanding and getting a visible

expression of this feeling in an exuberance of detail which would probably damage irreparably the susceptibilities of a western intellectual.

So much for the foreword: for the book itself the reader may take the author's modest claim and regard it as a picture book. It is a brilliant one.

K. J. CAMPBELL [A.]

QUENNELLITON

A HISTORY OF EVERYDAY THINGS IN ENGLAND, 1066-1499. By Marjorie and C. H. B. Quennell. Third Edition. 8vo. xiv + 242 pp. + 40 plates. London: Batsford, 1938. 8s. 6d.

When Mr. and Mrs. Quennell published the first volume of their *History of Everyday Things* they set a new mode in the teaching of history which is likely to be a constant and increasing influence. It all seems so very simple what they have done—to remove a bit of the pompous wrapping and to show life as it was lived; and yet, simple as it is, no one else has even got anywhere near to their success as expounders of everyday things. It would be unfair to suggest that many previous historians failed to appreciate the importance of social life; indeed, some like Macaulay, T. H. Green and Barnard (Barnard particularly) either glossed their more orthodox descriptions of men and policies and wars with social information or, like Barnard, wrote a definite companion. There have been others, too, like the incomparable G. G. Coulton, who as specialists in the history of certain periods have made contributions of a scholastic value far beyond anything that the Quennells have attempted, and yet it would probably be true and not unfair to the more academic historians to say that the Quennells' influence in making history alive exceeds that of any of the others.

The "Everyday Things" books were originally written for children of secondary or public school age, but many children much younger can thoroughly enjoy the books, and men and women long past school age can read them with delight and profit. The Quennell books are not of the kind to which that smug phrase "for children of all ages" can be applied. They have none of the pawky condescension of books written for children and a reviewer finds his return after twenty years to the first volume of *Everyday Things in England* just as refreshing as he found his first opening of it refreshing after the boredom of the orthodoxies of history according to Oman.

Mrs. Quennell has prepared this third edition following, as she says, the lines which her husband would himself have adopted. The result is not one of those half-hearted so-called new editions in which the correction of a few misprints and the date only have been changed. There are many more illustrations, including about forty full-page plates; some of these are photographs of buildings, some reproductions of mediaeval manuscripts to illustrate the development of the scribe's art (a new feature this) and some reproductions of the Quennells' own drawings.

The text has not been much changed from the second edition of 1931, but there are numberless small additions and a good deal of re-writing. The historical introductions to each century, dealing with the affairs of kings and princes,

have been re-written, sections have been added on mediæval medicine and surgery and phrases added here and there that fill out a picture or clarify some slight doubt.

The Quennell attitude to affairs comes somewhere between literary erudition and the virtues of a practical handyman: one is all ideas, literary, bookish but uncreative, the other concerned all with how and little with why. Those who have grown up under the Quennell influence should combine the qualities both of erudition and practical ability. These books bring people of both temperaments together, the man who does is encouraged to learn why what he does was done before him and how, the man who thinks is encouraged to learn what practical, physical evidences there are of thought in past ages.

ARCHITECTURAL THEORY

DE L'ARCHITECTURE. By Louis Hautecœur. 4to. 236 pp. Paris: Albert Morancé. 1938. 50 francs.

The author of this scholarly treatise on the æsthetic of architecture is Conservator of the National Museums of France and Professor at the Ecole des Beaux-Arts and of the Louvre School. *De l'Architecture* is a thoughtful, tolerant survey of the principles of building and the application of those principles throughout history from Vitruvius to to-day. It is clearly and precisely written so that at no point is the reader left in doubt as to the author's meaning. The expression is free in a rare way of those half-meanings and question-begging phrases that conceal the thought underlying most of the books of this kind. In fact, Professor Hautecœur has done with rare distinction what he set out to do.

In the introductory chapter the various theories of architecture are considered in so far as it can be done from the cultural and emotional and physical environment of the theorists—Vitruvius, the Renaissance theorists, Milizia, Winckelmann, Guadet to Corbusier. Of necessity, it is a brief survey, but suffices to show that no important contribution to architectural theory is unknown to Prof. Hautecœur—even John Belcher is included.

In the next chapter (No. I) the physical conditions of architecture, climate and soil, are considered and the point accepted—which of course no one now chooses to deny—that material considerations dictate form. Chapter two deals similarly with social and economic influences, "the architect builds for a client whose customs are those of his time . . . the plan, the kind of house depends on elements which are at once both social and economic in their bases."

The third chapter is called "the vocabulary of architecture." "The architect expresses himself in forms as a writer in phrases." Racine used barely two thousands words, the architect's vocabulary is even more limited.

The organic evolution of forms by the impact of changing materials and external conditions is traced in broad detail. The forms which excite most fervent admiration are the most ephemeral, but underlying them all will be seen the fundamental geometric forms of pillar, column, vault, etc. At one end of the series are the simple elemental geometric forms, at the other ephemeral items of fashion, in between the basic architectural forms. The first are independent of man, the second superficial to his real life, the basic architectural forms represent the profundity and permanence of his spirit.

The concluding chapter on the artistic conditions of

architecture deals with plan elements, three dimensional design, elevations and several matters such as scale, arithmetic proportion, optical correction and perspective.

This is an interesting and useful book which can be read with advantage by anyone willing to receive a corrective to the more ecstatic and less stable theorising that is usual.

HANDBOOK TO STYLES

THE STYLES OF ENGLISH ARCHITECTURE. Part I: The Middle Ages, Part II: Tudor and Renaissance. By Arthur Stratton. 8vo. 32 and 40 pp. London: B. T. Batsford, Ltd. 1938. 2s. 6d. each. Paper covers, 1s. 6d. each.

These are new and revised editions of Arthur Stratton's familiar handbooks, which were originally published "to encourage the increasing interest and attention devoted in recent years to the study of English architecture in elementary and secondary schools and other educational establishments." A sentence from the Introduction to Part I gives us concisely what we must infer is the attitude to the history of architecture which the books aim to encourage: "Without some knowledge of the state of the building arts it is impossible to visualise aright the setting amidst which historic events were enacted." These handbooks certainly provide the visual setting with a host of precise little black and white drawings which are of unquestionable value, but it is difficult to believe that the secondary schoolchild (let alone the elementary one), even though he had some interest in architecture, would find in them anything to be excited about, or that he could pick out from such a welter of information any simple conception of the how and why of the development of English architecture.

The popularisation of architecture amongst schoolchildren is of obvious importance, but if it is to be done at all it must be done with complete simplicity, and not with an air of explaining an obscure cult of style. It were better that the younger generation were encouraged to take a natural and lively interest in the general appearances of the present-day than that they should risk clouding their minds with particularised information about the appearances of the past. Architectural history, as a subject in the schools, surely becomes of less importance as it recedes into the past, where only a general picture is necessary. The present, and the immediate past out of which it emerged, is the business end of the whip, even though it is a whip tempered with all the sensible objections of teachers to whipping in any form.

A. C.

A CALENDAR FOR BEST FRIENDS

BEAUTIFUL BRITAIN. The "Country Life" Calendar for 1939. 2s. 6d.

There are more than enough pictorial calendars to provide the Christmas shopper with cheap gifts for all his lesser aunts, but too few to give with pride to the people who "really understand." *Country Life's* calendar is quite the best of its kind here or abroad. The fifty-two photographs are all lovely to look at, are excellently reproduced, and are chosen by a sympathetic and intelligent connoisseur of what is likely to excite the appreciation of calendar users. Last year the editor (who too modestly remains anonymous) devised by far the best method we have yet seen on any calendar of presenting the dates in tabular form; this is used again this year. The cover is a direct lithograph by Eric Ravilious. It is worth buying the calendar for that alone.

MASONIC HISTORY

THE TWO EARLIEST MASONIC MANUSCRIPTS. *Transcribed and edited by Douglas Knoop, G. P. Jones and Douglas Hamer. 8vo, viii+216 pp. Manchester Univ. Press. 1938.*

Professor Knoop is too well known to students of masonic history to need any introduction: the latest volume of research which he and his fellow workers in this field have recently published is of great interest not only to Freemasons but also to architectural historians, who will find the ancient precepts and regulations of the Regius and Cooke MSS. contain much valuable information on the early craftsmen and their work.

The two manuscripts printed in this volume are not, of course, the only or the oldest mediæval documents, such as fabric rolls, building accounts, contracts or the like, but they are the oldest surviving masonic documents which were written especially for masons: it is this intimate connection with the craft, with the indications of the viewpoint of the old master masons on the antiquity, integrity and high reputation of their craft, which gives them a unique value. In the Introduction the authors deal with the authorship and content of the manuscripts at some length before turning to a survey of the conditions of contemporary building industry and its organisation, the Articles and "Points" of the two manuscripts, the Seven Liberal Arts, Hermes and Euclid, the *Quatuor Coronati*, and, finally, an analysis of the manuscripts. The volume also contains a transcript of both MSS. in parallel columns, notes on each, a useful glossary, an index and a list of subscribers.

Both manuscripts are probably derived from a common source and (although the exact date of neither can be determined) the authors mention that "examination of the handwriting suggests to the palæographical experts of the British Museum that the Regius MS. was written about 1390 and the Cooke MS. about 1400 or 1410." It is also probable that the actual writers were clerks and were setting down in this form the oral traditions, customs and rules of the craft. The two manuscripts are thus of value to students as the earliest known member of a larger group of documents known as the "Old Charges." These all contain, as their main elements, first, a traditional history of the building industry and, secondly, a code of conduct and regulations to be observed by master masons, fellows and apprentices. The Regius and Cooke MSS. are of particular interest because each varies from this simple form. The Cooke MS. has a new and fuller history of masonry, the Regius MS. has, added to the usual contents, an account of the four crowned martyrs (*The Quatuor Coronati*), a description of the building of the Tower of Babel, an account of the Seven Liberal Arts, together with two sections borrowed from other sources: Mirk's *Instructions for Parish Priests* and the *Urbanitatis* poem.

A note on the building industry in England at this time is worth quoting:—

"The English building industry in the fourteenth and fifteenth centuries differed greatly both from most other industries at that time and from the building industry at present. Mediæval houses were generally built of wood and clay: stone and brick came into use gradually for chimneys and floors, but it is only in the modern period that these materials came to be commonly used in house building. In most mediæval industries production was on a small scale and was directed by independent craftsmen or 'little masters' . . . but the stone building industry was generally organised on a different basis. . . . Larger building

jobs were generally executed by what we should now call the 'direct labour' system: the employer—commonly the Crown or the Church—appointed certain officials, such as a master mason and a clerk of the works, to organise and administer the building operations, to arrange for supplies and engage the necessary craftsmen and labourers."

The authors conclude that, owing to this system and the fact that the sites of most of the larger buildings of the period were distant from towns, craft guilds of masons were the exception rather than the rule, and the system of apprenticeship was rare until a considerably later period. But it is obvious that some kind of organisation must have existed, for the uniformity of conditions prevailing in different parts of the country could hardly have been a pure coincidence. The two manuscripts here provide some useful evidence: the Cooke MS. refers to annual or triennial congregations of masters and fellows and a similar assembly is mentioned in the Regius MS., but with the difference that it was to be attended not only by masters and fellows but also by the lords and knights, squires, the Sheriff of the county and the mayor and aldermen of the city where it was held.

Thus the Articles and Points of the MSS., as well as giving the history of the craft, are a body of regulations and statement of the customs and usages which were generally observed, such as would be required at the annual or triennial assemblies. These, no doubt, replaced the earlier Book of Charges which grew from local traditions and usages.

Space does not permit a reference to the sections of the Introduction devoted to the Seven Liberal Arts, the mediæval versions of the story of Hermes and Euclid, or the history of the Four Martyrs, which have an especial significance for speculative masons. One can only say, in conclusion, that we shall look forward to the next contribution on early masonic history by Professor Knoop and his associates with considerable interest.

P. C. L.

ARCHITECTURAL BIBLIOGRAPHY

ANNUAL BIBLIOGRAPHY OF THE HISTORY OF BRITISH ART. Vol. III, 1936. *Univ. of Lond., Courtauld Inst. of Art. 8vo. xxiv+186 pp. London: C.U.P. 1938. 7s. 6d.*

The third issue of the Courtauld Institute's annual bibliography of British art has been published and is as useful as the preceding issues. The architecture section is reasonably complete, though there are still a number of important foreign journals not covered which occasionally deal with British architecture; but until British architecture gains a more important place in world architectural opinion these omissions are not important. The general classification is clear and the layout of entries simple and easy to follow. The main headings are: 1, general; 2, mediæval; 3, Tudor; 4, 17th and 18th centuries; 5, 19th century; 6, 20th century; 7, London; 8, provinces; 9, Scotland; 10, Ireland; 11, Wales; 12, individual architects; 13, architectural details; 14, architectural decoration; 15, building construction and materials; 16, economics and organisation of building trade; 17, preservation and repair; 18, town and country planning; 19, gardens; 20, study and teaching. Eight hundred and fifty-five subject references are included.

NORWEGIAN BUILDING MATERIALS

BYGGE HÅNDBOK, 1938. *Norske Arkitekters Landsforbund.*

This is the latest edition of the official handbook to Norwegian building materials and equipment issued by the Norwegian Architectural Society. It is a model of what such a guide should be, independent in authority, well written, illustrated and indexed.

Distribution of Books

During the past two years the library has accumulated a surplus stock of 300-350 books, which, following the plan started some years ago, are to be offered to the Allied Societies' and school libraries. **A detailed list has been prepared and will be sent to the librarians or secretaries who write for it.**

The R.I.B.A. in making this distribution has several objectives in mind: first, we wish to do everything in our power to improve local architectural libraries. The service that can be given by the central Institute library is limited: this we know as well as any provincial member. Ten books on the spot may be worth twenty in London. In the past five years almost a thousand books have been distributed through the R.I.B.A. and more are yet to come to any Allied Societies who are prepared to develop their libraries.

Secondly, each year the R.I.B.A. is offered books by its members or by the executors of deceased members. If we accepted only those books which we wanted here we should have to refuse a very large part of what we are offered, but by bearing the Allied Societies' needs in mind we accept almost everything that comes our way knowing that even if we do not want it some

smaller provincial library may welcome it. We think also that by being willing recipients we encourage gifts. In fact seldom is any would-be donor told that what he has to offer is worthless to us because "us" includes the whole organisation of the Allied Societies' libraries.

In passing we should like to add that this business of receiving surplus books, listing them and arranging for their distribution means a considerable amount of extra work for the library staff. We are not at all modest about it and want the applicants to realise that we, at least, take the distribution seriously.

The allocation will be made after Christmas. The schools and societies who wish to receive books are asked to apply now. In allocating the books the following considerations will be borne in mind:—The present size of the applicant's library; the use made of it; the facilities provided for readers in the library itself or for borrowers of books. Applicants will be asked to submit statements covering these and some other points when they return the lists with their choices marked. The books will be sent carriage forward and the recipients will pay all expenses of packing.

Review of Periodicals

Attempt is made in this review to refer to the more important articles in all the journals received by the Library. None of the journals mentioned are in the Loan Library, but the Librarian will be pleased to give information about price and where each journal can be obtained. Members can have photostat copies of particular articles made at their own cost on application to the Librarian.

Normally the journals referred to in this review, all of which are in the R.I.B.A. reference library, cannot be borrowed. Members are, however, asked to encourage their local public libraries and their local society's library to take as many journals as they can afford; and they are asked, for the convenience of local members, to notify the R.I.B.A. of what journals are known to exist in public or private hands in their own neighbourhood.

SCHOOLS

OFFICIAL ARCHITECT. 1938. October. P. 106.

L.M.S. School of Transport, Derby, by W. H. Hamlyn [F.]. A full description.

OFFICIAL ARCHITECT. 1938. November. P. 168.

East Sussex School of Agriculture, Plumpton, by E. A. Verger [F.], with accommodation for forty men students and a residential staff.

LABORATORIES

DESIGN AND CONSTRUCTION. 1938. November. P. 431. Laboratories for the Metropolitan Water Board, by Stanley Hall & Easton and Robertson.

EXHIBITIONS

ARCHITECTS' JOURNAL. 1938. 17 November. P. 790. Electrical Section, Woman's Fair at Olympia, 1938, by Raymond McGrath [A.].

ARCHITECTURAL RECORD (NEW YORK). 1938. November. P. 67.

Very full preview of the New York World's Fair, 1939, dealing with individual buildings in course of construction, general notes on the design of the exhibition, foundations, super-structure, landscaping, circulation, lighting and sound amplification.

L'ARCHITECTURE D'AUJOURD'HUI (PARIS). 1938. October. P. 15.

Section on exhibitions. The National Swiss Exhibition, 1939; the Liege Exhibition, 1939; New York World's Fair, 1939; Rome, 1942; Dusseldorf, 1937; and Glasgow, 1938.

ARCHITETTURA (MILAN). 1938. October. P. 589. Models and layout for the New York World's Fair, 1939.

RADIO

ARCHITECTURAL RECORD (NEW YORK). 1938. November. P. 48.

Circular broadcasting studio in New York City, by L. Bar-mache and R. Brugnoli.

BATIR (BRUSSELS). 1938. October. P. 443. Studios and offices for the "Institut National de Radio-diffusion" at Brussels, by J. Diongre.

CIVIC

- ARCHITECTS' JOURNAL. 1938. 17 November. P. 793.
 ARCHITECT AND BUILDING NEWS. 1938. November 18. P. 185.
 ARCHITECTURE ILLUSTRATED. 1938. November. P. 146.
 Poplar Town Hall, by Culpin & Son [F/A.].
 DESIGN AND CONSTRUCTION. 1938. November. P. 435.
 Norwich City Hall, by C. H. James and S. Rowland Pierce [FF.].
 ARCHITECTURE (SYDNEY). 1938. October. P. 252.
 BUILDING (SYDNEY). 1938. September. P. 35.
 Results of the Sydney Law Courts competition. First premium, Peddle, Thorp and Walker.

HOTELS AND RESTAURANTS

- ARCHITECTURAL RECORD (NEW YORK). 1938. November. P. 50.
 New bar at the Sherman Hotel, Chicago, by Holabird & Root.

OFFICES

- DESIGN AND CONSTRUCTION. 1938. November. P. 423.
 The new Adelphi, by Stanley Hamp [F.].

MARKETS

- ARCHITECT AND BUILDING NEWS. 1938. 25 November. P. 223.
 New cattle market at Spalding, by W. E. Norman Webster [F.].

SHOPS

- ARCHITECTURAL RECORD (NEW YORK). 1938. November. P. 43.
 Store in Los Angeles, by S. O. Clement. Provision for car parking (60 per cent. of the customers arrive by car). Reinforced concrete structure. The only windows are long horizontal panels of glass brick well above eye level. The building is completely air-conditioned.

INDUSTRIAL

- ARCHITECT AND BUILDING NEWS. 1938. 18 November. P. 186.
 Motor assembly plant at Biel, Switzerland, by R. Steiger.
 ARCHITECT AND BUILDING NEWS. 1938. 25 November. P. 216.
 Messrs. Boots Pure Drug Co., Ltd., Nottingham; a building for the manufacture, storage and dispatch of dry goods such as powders, tablets, etc., by Sir E. Owen Williams.

TRANSPORT

- DESIGN AND CONSTRUCTION. 1938. November. P. 444.
 Reference section on air, road and rail transport. Ringway airport, Manchester; buildings at Wolverhampton and Heston airports; Exeter municipal airport; Leeds-Bradford joint municipal airport; Belfast harbour airport; Amsterdam airport; and an assembly building at Baltimore. An article on the design of commercial garages, their finishing and equipment, by H. A. J. Lamb [A.], illustrating showrooms and filling station at Uxbridge, central garage and workshops at Stepney, and trolleybus depot at Bexley. Also two L.P.T.B. railway stations, Ruislip Manor and Rayner's Lane.

HOSPITALS

- R.I.B.A. JOURNAL. 1938. 21 November. P. 70.
 Part II of "Operating Theatres," by W. H. Evans, dealing with interior finishes, accessories and fittings, and ancillary rooms and surgical suites.

SPORTS BUILDINGS

- FERRO-CONCRETE. 1938. October. P. 94.
 Covered swimming baths at Fenham and Jesmond, Newcastle.
 L'ARCHITECTURE D'AUJOURD'HUI (PARIS). 1938. October. P. 40.
 Open-air thermal swimming pool in Czechoslovakia, by B. Fuchs, with restaurants, children's playing ground, hair-dressing shop, and delightful layout of terraces on steeply sloping ground.

HOUSES

- ARCHITECTURAL FORUM (NEW YORK). 1938. November. P. 312.
 Eight houses designed for four typical American families, covering an income range of \$2,000 to \$12,000 a year. Sponsored by the magazine *Life*. For each family one modern and one traditional house were designed. The scheme is well illustrated, and explained by comments from the architects and the families. The architects were: E. D. Stone, R. Koch; W. W. Wurster, H. R. Kelley; Lloyd Wright, R. B. Wills; Harrison & Fouilhoux, A. Embury.
 A copy has been added to the R.I.B.A. Loan Library.
 BYGGMÄSTAREN (STOCKHOLM). 1938. No. 30. P. 321.
 Section on "The House and Nature," illustrating three holiday houses by R. Engströmer, E. G. Asplund and B. Jonson.
 BYGGMÄSTAREN (STOCKHOLM). 1938. No. 31. P. 337.
 Eight small country houses in Sweden.

FLATS

- ARCHITECT AND BUILDING NEWS. 1938. 25 November. P. 210.
 Reinforced concrete frame flats at 65 Ladbroke Grove, London, by Maxwell Fry [A.].

CONSTRUCTION

- OFFICIAL ARCHITECT. 1938. November. P. 179.
 "Progress with Reinforced Concrete," an article with good illustrations of the Dywidag system and the use of barrel vaults in covering large rectangular areas.
 ARCHITECTURAL RECORD (NEW YORK). 1938. November. P. 53.
 Interesting glued plywood rigid-bent trusses in a building combining auditorium and gymnasium in Washington, by W. H. Rothe.
 ARCHITECTURAL RECORD (NEW YORK). 1938. November. P. 138.
 Details of pool construction, bird-baths, lily ponds, and their water supply and drainage.

BIOGRAPHICAL

- BATIR (BRUSSELS). 1938. October. P. 421.
 Article on the work of Alvar Aalto, by P. L. Flouquet.

Accessions to the Library

1938-1939—III

Lists of all books, pamphlets, drawings and photographs presented to or purchased by the Library are published periodically. It is suggested that members who wish to be in close touch with the development of the Library should make a point of retaining these lists of reference.

Any notes which appear in the lists are published without prejudice to a further and more detailed criticism.

Books presented by publishers for review marked

R.

Books purchased marked

P.

* *Books of which there is at least one copy in the Loan Library*

ARCHITECTURE

EDUCATION

PARIS: INSTITUT DE FRANCE 06 (97) (44)
Annuaire pour 1938.

6½". Paris: Imprimerie Nationale. 1938.

THEORY

LANCASTER (OSBERT) 72.01

*Pillar to post. The pocket lamp of architecture.

9½". xiv+88 pp. incl. pls. Lond.: John Murray. 1938.

5s. R. & P.

HISTORY

STRATTON (ARTHUR) 72.03 (42)

Introductory handbook to the styles of English architecture.

Part i. The Middle Ages.

3rd ed. 8½". Lond.: Batsford. [1937.] R.

Part ii. Tudor & renaissance.

2nd ed. 8½". Lond.: Batsford. [193—.] R.

REILLY (C. H.) 72.036.6 (42): 92 R

*Scaffolding in the sky. A semi-architectural autobiography.

8½" xiii+352 pp.+ (5) pls. Lond.: Routledge. 1938.

12s. 6d. R. & P.

WRIGHT (FRANK LLOYD) 72.036.6 (73): 92 W

An Autobiography.

9" x 7½". (vi)+371+(xi) pp.+ (pls.) photos. Lond., &c.: Longmans, Green. 1938. 17s. 6d. P.

PROFESSIONAL PRACTICE

KNIGHT (CHAS.), publ. 72.08: 34

*K—'s Annotated model byelaws &c.

*9th ed. By C. Roland Woods.

9½". xi+410 pp. Lond. [1938.] £1 15s.

P. for Loan Library.

BUILDING TYPES

(CIVIL)

Inf. file 92 P

PUBLIC RECORD OFFICE, London 725.151 (42.1) (064)

The Building of the Public Record Office. A pictorial exhibition of its history.

pam. 8½". n.p. [1938.] Presented.

FINSBURY, borough 725.7/8 (42.12)

Opening of the Finsbury Health Centre . . . 1938. [B.

Lubetkin, architect.]

ob. 8½" x 10½". [Lond. 1938.]

Presented by the Architect.

(RELIGIOUS)

CIBULKA (JOSEF) 726.4: 728.81 (437 P)

Kostel svatého Jirí na hrade Prazském.—Die St. Georgskirche

&c.—L'église St. Georges au Château de Prague.

8½". 64+(viii)+(ii)+xv pp.+31 pls. Prague. 1936.

Presented by the Czechoslovak Ministry of Education, through the Czechoslovak Legation.

CHALUPNICEK (MIROSLAV) 726.5 (437 P)

Praha, mesto chrámu.—Prag, die stadt &c.—Prague, city of churches.—Prague, ville &c.—Praga, la città &c.

11½". (xii)+(i) pp.+64 pls. Prague: Zikes. [1937.]

Presented by the Czechoslovak Ministry of Education, through the Czechoslovak Legation.

[VISINGSÖ, Sweden] 726.5 (485 V)

The Brahe Church. [Name of town in pencil MS. only.]

leaflet. 7". Jönköping. 1938.

Presented by Mr. Antony Pott [A.].

M. (F. G.) 726.54 (42.12) SMA

St. Mary Abchurch, E.C.4. [Guide.]

leaflet. ob. 4½" x 5½". [Lond. 193—.] Presented.

(EDUCATIONAL)

ESDAILE (ARUNDELL) 727.1 (42.25 L)

Lancing [College]. An address &c.

pam. 8½". Lond.: priv. prin. 1938.

Presented by the Author, M.A.

BOARD OF EDUCATION 727.112

Educational pamphlets:—

No. 107. Suggestions for the planning of . . . elementary schools.

[New ed. Reprint.] 7½". Lond.: H.M.S.O. 1938. 2s.

To Loan Library. Replacing a copy of 1936 ed.

ZANGENBERG (H.) 727.7.093.8 (489 L)

Frilandsmuseet [open-air museum] ved Lyngby. Museets gamle huse og gaarde [old houses, etc.]. [Illus. by Hakon Spliid.]

8½". Copenhagen: Oberg. [1933.]

With COPENHAGEN: FRILANDSMUSEET [Open-air museum] [Leaflet]

(In English and German) [19—], inserted.

Presented by Mr. Antony Pott [A.].

(DOMESTIC)

MATTHEWS (MISS OLIVE) 728.1: 649

Housing for old and single people. Paper &c. (Institute of Housing [Incorporated].)

pam. 9½". Birmingham. 1938.

Presented by the Author.

WEILBACH (FREDERIK) 728.81 (489 K)

Kronborg Castle. A guide and an historical account. Completed by Charles Christensen. . . [a section] by Knud Klem.

Trans. by Nina Sabra and P. Boisen.

8". 82 pp.+pls. Elsinore: Kai Brammer. [19—.]

Presented by Mr. Antony Pott [A.].

R.I.B.A. 728.86 (064)

[Exhibitions.] The Small house.—An exhibition . . . to show how . . . development could be improved.

9½". 22 pp. Lond. [1938.]

DETAILS, SYMBOLISM

FETT (HARRY) 729.9.046

*Var frue jomfru Maria. (Kunst og kulturs serie.)

10½". Oslo: Gyldendal. 1937.

Presented by the Author [Hon. Corr. Mem.]. To Loan Library.

ALLIED ARTS

QUENNELL (MARJORIE and C. H. B.) 7.03 (42): 3

*A History of everyday things in England.

*First part. 1066-1499. 3rd ed. 8½". Lond.: Batsford.

1938. 8s. 6d. R. To Loan Library.

MAYER (L. A.), editor 7.033.3: 016

Annual bibliography of Islamic art and archæology, India excepted.

Vol. ii: 1936. 9½". Jerusalem: Divan. 1938. R.

STECH (V. V.) 73.034 (437 P).77
Sochari prazského baroku.—Les sculpteurs baroques de Prague.
—Prager &c.

8½". 59+(ii)+(iii) pp.+39 pls. Prague. 1935.
Presented by the Czechoslovak Ministry of Education, through the
Czechoslovak Legation.

SHAPLAND (H. P.) 749 (42)
A Key to English furniture.
7¼". xiii+202 pp.+xvi pls. Lond., &c.: Blackie. 1938.
5s. R.

BUILDING SCIENCE
STRUCTURAL MECHANICS
INSTITUTION OF STRUCTURAL ENGINEERS
Year book and list of members, . . . 1938-1939.
[1938.] 2s. R.

MATERIALS 691.11 : 634.98
DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH:
FOREST PRODUCTS RESEARCH
Bulletins :

No. 1. Dry rot in wood. 691.11 : 620.193.83
3rd ed. 9¼". Lond.: H.M.S.O. 1938. 1s. Presented.

CONSTRUCTION 693.1 : 366]091
KNOOP (DOUGLAS), JONES (G. P.), HAMER (DOUGLAS), editors
The Two earliest masonic MSS. The Regius MS. . . . The
Cooke MS. &c. Transcribed and edited by D—K—, &c.
8½". viii+216 pp. Manchester : U.P. 1938. 12s. 6d. R.

PROOFING 699.878
HUNTER (L.)
Domestic pests. &c.
xii+235 pp. Lond.: John Bale, Sons & Curnow.
1938. 7s. 6d. R.

ENGINEERING
INSTITUTION OF MECHANICAL ENGINEERS
Proceedings. Vol. 139. 1938 April-May. 1938. R.

TOPOGRAPHY 91 (485 V)
WALLIN (SVEN)
Vadstena (Sweden). Its abbey, castle and memories.
pam. 7½". Motala : Borgströms. 1937.
Presented by Mr. Antony Pott [A.].

TOWN AND COUNTRY PLANNING, GARDENS, RURAL
PRESERVATION 71 : 016 (73)

HARVARD UNIVERSITY, Cambridge, Mass.: LIBRARY OF THE
DEPARTMENTS OF LANDSCAPE ARCHITECTURE AND REGIONAL
PLANNING
Books of the month. Accessions of the library &c.
[No serial numbers.] (Nov.) dupl. typescript
(printed cover). 11" bound as ob. 8½"×11".
Cambridge, Mass. 1938.
With Some references on Flood plain zoning (Oct. 21) inserted.

PALESTINE, government : TOWN PLANNING ADVISER 711.4 (56.94)
Annual report for 1937.
12¼". Jerusalem : Printing & Stationery Office.
[1938.] R.

OXLEY (T. D.)
The Garden and its relation to architecture and man. (Thesis
for Final Examination, July.)
typescript, *Photos.*, and *Repr. of D.* ob. 8"×10". 1938.
Presented by the Author.

BIRMINGHAM CIVIC SOCIETY
Report . . . [on] 1937-8. 1938. R.

Correspondence

HELP FOR REFUGEE ARCHITECTS

London,
23.11.38

To the Editor, JOURNAL R.I.B.A.

DEAR SIR,—We should be grateful if you would allow us through the columns of the R.I.B.A. JOURNAL to appeal to our fellow members on a matter of urgency.

Germans and Austrians of almost every shade of religious and political outlook (many of them being architects and other persons of professional standing), have found refuge from Nazi Dictatorship in Czechoslovakia. The German Government is now demanding that they should be handed over to the Gestapo.

The situation is desperately urgent. These innocent persons must be saved from imprisonment or execution. They must be rescued immediately.

The British Government is willing to grant the necessary visas to these refugees provided that their keep can be guaranteed in this country, pending future arrangements for emigration.

A group of students and staff of the Architectural Association School have agreed to organise such assistance as they can, in co-operation with the British

Committee for Refugees from Czechoslovakia, and it is on their behalf that we make this appeal.

This assistance is taking the form of providing lodging and funds. Ten offers of hospitality and over £140 were promised within the School in the first twenty-four hours. Far more is needed. Will you help?

The British Committee for Refugees from Czechoslovakia is the guarantee that the most urgent cases will be dealt with first, and that emigration will be arranged for as soon as possible.

The actual funds will be directly administered by the interested members of the A.A.

We appeal for (a) donations, (b) weekly subscriptions, (c) offers of hospitality for periods up to two months. Please write and say whether you are prepared to help, and in what way. Write, not to the A.A., but to the Acting Secretary, Miss Brookhouse, 9 Gower Street, London, W.C.1. Cheques should be made payable to the Architects' Czech Refugee Fund.

We are, Sir,

Yours faithfully,

HENRY M. FLETCHER
MAXWELL FRY
RAYMOND UNWIN

Notes

APPOINTMENT VACANT SCHOOL OF ARCHITECTURE, LEICESTER

Applications are invited for the post of Full-time Assistant Lecturer in Architecture at the Leicester College of Art and Crafts School of Architecture. Applicants must be Associates of the R.I.B.A. or hold a degree or diploma of a recognised School of Architecture. Competence in the teaching of architectural design is essential and candidates should have had at least two years office experience.

Salary: Burnham Scale (£234 to £480 by annual increments of £15). Initial salary according to qualifications and experience.

Applications by letter should reach the Registrar of the College not later than 9 December.

BOUND VOLUMES OF THE "JOURNAL"

Members are reminded of the fact that in October there was a notice saying that bound volumes of the JOURNAL in various qualities could be obtained in exchange for the individual numbers plus small extra payments. Every year

the Library receives innumerable requests for information which can only be answered by reference to the JOURNAL. The member who keeps bound volumes is not only able to save himself the time and trouble spent in writing to the R.I.B.A. for information by having it at his elbow, but probably saves himself money. Those who want to exchange their loose issues for bound volumes are advised to apply soon.

R.I.B.A. DANCE CLUB

The following are the dates of the remaining dances at the R.I.B.A. during the current session: Friday, 9 December 1938; Friday, 3 February 1939; Friday, 21 April 1939.

The dances will start at 9 p.m. and finish at 1 a.m. The price of tickets is 6s. each. Not more than ten tickets will be issued to any one person.

Applications must be accompanied by a remittance for the appropriate amount, and applications cannot be made by telephone. Applications for tickets should be sent as soon as possible to Mr. R. W. H. Robertson, Clerk to the Dance Club, at the R.I.B.A. Cheques and postal orders to be made payable to the R.I.B.A. Dance Club.

Obituaries

GEORGE CHURCHUS LAWRENCE [F.]

We regret to record the death on 8 November of Mr. George Churchus Lawrence, one of the leading members of the profession in Bristol, and one who was largely instrumental in founding the R.W.A. School of Architecture, Bristol, and the Wessex Society of Architects.

Mr. Lawrence, who was born in 1872, was a Bristol man. He was educated at the Grammar School and was articled to Mr. Henry Crisp, of Messrs. Crisp & Oatley. In 1896 he became an Associate and started to practise on his own account, but in 1901 he entered into a partnership with Sir George Oatley which continued until 1936. Since then he practised as G. C. Lawrence and Partners, with Mr. B. Ivor Day [A.] and Mr. T. H. B. Burrough [A.], who are continuing the practice under the same name.

With Sir George Oatley he was responsible for the reconstruction of the Westminster Bank, Corn Street, and also other banks for the same company at Frome, Bridgwater, Trowbridge, Kingswood, etc. He reconstructed the Victoria Rooms when it was taken over by the Students' Union of the University. He was responsible for the Scottish Provident and the Sun buildings, the First Church of Christ Scientist, Stokes Croft, the Y.M.C.A. building in Colston Street, the Bristol Eye Hospital, and the Sanatorium Ward blocks and nursing home at Ham Green.

He also won the competition for the Baptist College, Tyndall's Park, and was placed third in the competition for the original Colston Hall.

Since 1936 he was architect for a smallpox hospital at Ham Green, the extensive reconstruction at New College, Hampstead, and Dorset Mental Hospital, and the Southmead Hospital development scheme of which the first part is now in progress.

Mr. Lawrence was a member of the Allied Societies Conference from 1922 to 1935 and Chairman from 1929 to 1931; he was an Associate member of Council 1923-24 and a member from 1924-27 and 1929-35. He was a vice-President 1928-29.

Mr. Lawrence's partner, Mr. Ivor Day [A.], writes as follows:

The death of Mr. Lawrence is a great loss to his firm, to the architectural profession, to the building industry, and to the city of Bristol.

He was a stickler for accuracy in architecture and in draughtsmanship, and for professional ethics. His tastes were simple—a trait that was evident in his designs. He always considered that to build a house for someone else was one of the greatest responsibilities that could be an architect's.

He was a great admirer of the classic style, its beauty of line and detail, and he delighted in working in that manner. A recent discovery in the hall of his Georgian offices gave him great pleasure. When decorators removed the old lining paper from the ceiling, they exposed a unique, hand-painted, acanthus-leaved centre-piece.

Mr. Lawrence had a distinct expert leaning towards the legal side of his profession, a fact which made him eminently suited for official positions in its government.

He was a prominent member of Clifton Down Congregational Church, where he occasionally did voluntary duty at the organ.

Mr. G. D. Gordon Hake [F.] writes:

I should like to pay a personal tribute to the work done by George Churchus Lawrence for architectural education in the West of England.

It was largely due to his enthusiasm and acumen that in the early 1920's the Royal West of England Academy School of Architecture was founded by the Bristol Society of Architects.

Undaunted by the entire lack of endowment for the school, he obtained and personally supported a generous financial backing from local architects.

Never attempting to interfere with the curriculum he, nevertheless, was always ready and willing to help with advice and support. The fact that in recent years he left the more active control in the hands of others was, as he often said,

a proof of his belief that the school had proved its worth and grown to maturity.

I shall always treasure the memory of many kindnesses bestowed on a newcomer to a difficult task by G. C. Lawrence.

H. C. KENT [F.]

We regret to record the death on 9 August of Mr. Harry Chambers Kent, who practised in Sydney, Australia, for over fifty years, and was twice President of the Australian Institute of Architects. He was also a Fellow of the Royal Society of Australia.

Mr. Kent was born in 1853. He took an Arts degree in 1873 at the University of Sydney and received his training

in the office of Mr. John Young, builder, there being no School of Architecture in Sydney then.

Mr. Kent began to practise in 1882. In 1899 he took into partnership Mr. Henry E. Budden and in 1912 Mr. Carlisle Greenwell, the partnership continuing until 1919, when he joined Mr. H. H. I. Massie, who will continue the practice under the old title, Kent and Massie.

The best known of Mr. Kent's buildings is the Royal Alexandra Hospital for Children, Sydney. Among others built during a long and busy career are the head office for the Commercial Banking Co., Sydney; the Western Suburbs Cottage Hospital; the Carrington Convalescent Hospital, Camden, N.S.W.; the Royal Insurance Building, Sydney; besides numerous stores, banks, churches and private houses in Sydney and New South Wales.

Students and Probationers

ELECTION OF STUDENTS R.I.B.A.

The following were elected as Students R.I.B.A. at the meeting of the Council held on 24 October 1938.

Adamson, Hamish Edgar Donald, *Mill Hill*. Alexander, William Edward, *Southern Rhodesia*. Allerton, Kenneth, *South Lowestoft*. Almond, Eric, *Wadasey*. Baker, Lawrence Frederick, *London, S.W.17*. Boyd, Peter Fredric Nickolson, *London, N.8*. Brooke, John Richard Peter, *London, W.2*. Bull, William Ralph, *London, W.11*. Carey, Oliver Cecil Francis, *Elstree*. Carpenter, Ronald Dudley, *Richmond*. Chapman, Charles William Ernest, *London, N.13*. Clifford, Patience Lisa, *London, W.C.1*. Curtis, Frederick Francis Charles, *Liverpool, 22*. Dharadhar, Trikamdas Liladhar, *Bombay*. Down, Arthur Frederick, *Bromley*. Fairlamb, Bernard William, *Newcastle-upon-Tyne, 6*. Fennell, Thomas Elliott, *Fence Houses, Co. Durham*. Ferguson, Percival Richard, *Runwell, Essex*. Friend, Peter Donovan, *London, N.10*. Gani, Abdul Quadir Abdul, *Bombay*. Gedrych, Thomas David, *Cardiff*. Gotelee, Frederick Alan, *Newbury*. Hall, John Buchan, *Galashiels*. Henderson, James Murie, *Bothwell, Lanarkshire*. Hilton, Richard Frank, *Canuden, Essex*. Holbrook, Leonard Charles, *Croydon*. Jennings, Eric William, *Bath*. Joglikar, Shridhar Krishna, *Bombay*. Kennedy, James Cowie, *London, N.10*. Lancaster, William Douglas, *near Blackpool*. Leonard-Williams, David Haigh, *Devonport*. Lewin, Frederick Alexander, *Tonbridge*. Mhatre, Krishnarao Balkrishna, *Bombay*. Moreton, John Loftus, *London, W.14*. Murray, James, *Edinburgh*. Nightingale, John Alan, *Sanderstead*. Paterson, James, *Edinburgh*. Paul, Ernest Henry, *Redruth*. Peiris, Frangige Peter Henry Wilson, *Ceylon*. Poole, John Reginald Maurice, *London*. Portwood, Valentine Thomas Henri, *London, N.W.1*. Reid, John Tweedie, *Kilmarnock*. Riley, Walter Stanley, *Westcliff-on-Sea*. Roberts, Bertram James, *London, S.W.9*. Roberts, Jack, *Cookridge*. Rother, Vincent Jacob, *London, W.1*. Sanders, William Hamilton, *Glasgow*. Saunders, Bertie John, *Clapton Park*. Thesiger, Cedric Paul, *Sunninghill*. Todd, Alexander Smart, *Coatbridge*. Unsworth, Thomas Wilkinson, *Bolton*. Vijayakar, Mukund Mothabhoi, *Bombay*. Walker, Frederick Arthur, *Edinburgh*. Wark, William Ramsay, *Kilmarnock*. Yardi, Sadashiv Raghunath, *Bombay*.

The following were elected as Students R.I.B.A. at the meeting of the Council held on 7 November:—

Bacon, Amy Theresa, *Wilmslow*. Bayne, Annie Margaret, *Edinburgh*. Faulkner, Patrick Arthur, *Oxley*. Lawrence, John Anthony, *London*.

R.I.B.A. PROBATIONERS

During the month of October 1938 the following were enrolled as Probationers of the Royal Institute:—

Adams, Reginald Hugh, *Chippenham*. Astins, Norman Percy, *London*. Barber, Thomas Arnold, *London*. Belford, Graham James, *Jersey*. Berry, Kenneth, *Pontefract*. Bird, Jacqueline Mary Rowan, *Cardiff*. Birdsell, David, *Leeds*. Bottle, Frederick Roger, *London*. Bowe, William Cecil, *Epsom*. Boxall, Reginald Arthur, *Salford*.

Broad, Helen Elizabeth, *Edenbridge*. Buckley, Douglas Dransfield, *Wakefield*. Cannon, Margaret Joy, *Guildford*. Chapman, Charles, *Pontefract*. Chilton, Reginald Frank, *Chelmsford*. Christy, Roy Thompson, *Southport*. Clay, John Arthur, *Graiesend*. Cox, Oliver Jasper, *Teddington*. Crisp, James Wallace, *King's Lynn*. Crocker, Montague Ernest, *Newquay*. Cross, David Charles, *Northampton*. Dick, Robert Brunton, *Edinburgh*. Eatwell, Peter Franklin, *Letchworth*. Escott, Cyril Incedon, *Exeter*. Field, Bryan Peter, *Wembley*. Gleave, Sydney, *Stockport*. Goldhill, David Philip, *London*. Gorbng, Raymond, *London*. Greenen, Frank Roland, *Bournemouth*. Guise, John Bernard, *W. Bromwich*. Hall, Victor, *Wakefield*. Harris, John Robert, *Chobham*. Harris, Richard Fortescue, *Leicester*. Harty, Michael Hayes, *Cuffley*. Hay, Charles Dewar, Jr., *Musselburgh*. Midlothian. Hoogan, Ajit Singh, *Zanzibar*. Horrocks, John, *Scarborough*. Hudson, Albert Cornelius Charles, *Bournemouth*. Hurst, Norman George, *Coventry*. Jackson, Kenneth Connor, *Borrowash, Derbyshire*. Jackson, Thomas Harry, *Lancaster*. Jennings, Arthur John Rackham, *London*. Johnson, John Francis William, *Leeds*. Johnson, Ralph Blackmore, *London*. Jones, Ernest Douglas, *Swansea*. Jones, Geoffrey Graham, *Wolverhampton*. Jones, Stanley Wilfred, *Wolverhampton*. Kelly, Gerard Agustive, *Downpatrick*. Khan, Masud Salahuddin, *London*. Lawrence, John Anthony, *Swanage*. Leach, Alexander, *Manchester*. Lewis, Arthur Herbert, *St. Albans*. Lewis, Tyssil Wesley George, *Romford*. Lucas, Wilfrid Gool, *Highgate*. McCall, Archibald Robert, *Lochmaben, Dumfries*. McClune, John Terence, *Barrow-in-Furness*. Marlow, Clement Thomas, *Kettering*. Matthew, Henry Douglas, *Edinburgh*. Mitchell, Leslie Vivian, *London*. Moffat, John Boyd, *London*. Moore, Walter Gordon, *Crieff*. Mulhall, Bernard, *Birmingham*. Musgrave, Brian Rhodes, *Shipley*. Newcombe, Arthur Sidney, *London*. Nunn, James Huntley, *London*. Nuttall, Frederick Rodley, *Clitheroe*. Parkinson, Norman Frederick, *Quernmore, Lancs*. Petit-Jean, Gerard Maurice, *Clacton-on-Sea*. Pilkington, Alec Leitch, *Swinton*. Price, David Lyn, *Cardiff*. Pullan, Helen Margaret, *Leeds*. Purser, Hugh Edmund Vaughan, *Leeds*. Purvis, Bertram Lambert, *London*. Radway, Reginald Edward, *Swindon*. Rich, Stanley George, *Hailsham, Sussex*. Roberts, Christopher Howard, *Newcastle-on-Tyne*. Roberts, Norman, *Bury*. Robinson, Margaret Susan, *Newnham-on-Severn, Glos*. Rylatt, Jack, *York*. Shepherd, Alexander Duncan, *London*. Shoolheifer, Emanuel, *London*. Simpson, John Alexander, *Portknockie*. Smith, Frederick Addison, *Stoke-on-Trent*. Smith, Stanley Frederick, *London*. Staples, John, *Bromley, Kent*. Sunderland, Frederick Arthur, *Burley-in-Wharfedale, Yorks*. Symonds, Richard Clough, *Wrexham*. Tranmer, Eric William, *Harrogate*. Turner, Reginald Brandrick, *Macclesfield*. Walker, James, *Dundee*. Wallace, James, *Durleton, E. Lothian*. Warwick, James Cochrane, *London*. Wells, Edward Martin Glossop, *London*. Welsh, Jane Anderson, *Kirkcaldy*. Whishaw, Harold Alexander, *Cambridge*. Widdaker, Thomas Jackson, *Leeds*. Wilde, Ronald George, *Eastbourne*. Woodford, Charles Albert, *Camberwell*. Yates, Daniel Stuart, *Leeds*.

Notices

INFORMAL GENERAL MEETING, WEDNESDAY, 14 DECEMBER 1938, AT 6.30 P.M.

The first Informal General Meeting of the Session arranged by the Junior Members' Committee will be held on Wednesday, 14 December 1938, at 6.30 p.m., when there will be a discussion on:—

“Official A.R.P. and the Architect.”

The discussion will be opened by:

Professor J. B. S. Haldane, M.A., F.R.S., and Mr. R. T. F. Skinner [A.].

Mr. K. J. Campbell [A.] will be in the chair. Tea will be served from 5.45 p.m.

Members and Students are reminded that there will be no reporters at the meeting and that speakers are expected to express their opinions as freely and as boldly as they wish.

R.I.B.A. CAMERA CLUB

The Club is open to all members of the R.I.B.A. or Allied Societies and full particulars of membership can be obtained from the Hon. Secretary, Miss A. J. Dicker, 8 Gurney Drive, Finchley, N.2.

The following lecture will be given at the R.I.B.A. at 8 p.m. on Wednesday, 14 December: “The Dufaycolour Process,” by Messrs. Dufay-Chromex, Ltd. Members wishing to attend should notify the Hon. Secretary of the Club.

ANNUAL AWARD OF PRIZES AND STUDENTSHIPS 1939

At the General Meeting on Monday, 9 January 1939, Mr. S. Rowland Pierce [F.], a former Rome Scholar in Architecture, will deliver the criticism on the drawings submitted for the Prizes and Studentships 1939, in place of Mr. Howard M. Robertson, M.C., S.A.D.G. [F.], who is prevented from giving his criticism owing to absence abroad.

The Council's award of prizes and studentships will also be announced at that meeting.

THE USE OF TITLES BY MEMBERS OF THE ROYAL INSTITUTE

In view of the passing of the Architects Registration Act 1938, members whose names are on the Statutory Register are advised to make use simply of the title “Chartered Architect” after the R.I.B.A. affix. The description “Registered Architect” is no longer necessary.

Members who are qualified for registration and have not already done so are reminded of the importance of applying for such registration without delay. Full particulars will be sent on application to the Secretary R.I.B.A.

LICENTIATES AND THE FELLOWSHIP

The present regulations governing the examination of Licentiates who, being otherwise eligible, wish to qualify for admission as Fellows provide that in the first place the candidate shall submit for approval by the Council working drawings of one or more of his executed buildings, supplemented by photographs and by original sketches or measured drawings of actual work, and—

- (1) should the work so submitted be, in the opinion of the Council, of sufficient merit to exempt the candidate from further examination, he may be so exempted;

- (2) if the work submitted is approved by the Council the candidate is required to submit himself to an examination;

- (3) if the work so submitted is, in the opinion of the Council, inadequate, his application is not further entertained.

By a resolution of the Council passed on 4 April 1938, on and after 1 January 1939 all candidates whose work is approved will be required to sit for the examination, which will be the design portion of the Special Final Examination, and no candidates will be exempted from the examination.

NOTE.—The above resolution will not affect Licentiates of over 60 years of age applying under Section IV, Clause 4 (c) (ii) of the Supplemental Charter of 1925.

ASSOCIATES AND THE FELLOWSHIP

Associates who are eligible and desirous of transferring to the Fellowship are reminded that if they wish to take advantage of the election to take place on 6 March 1939 they should send the necessary nomination forms to the Secretary R.I.B.A. not later than Saturday, 14 January 1939.

THE RECEPTION OF NEW MEMBERS AT GENERAL MEETINGS

It has been decided by the Council to modify the procedure for the introduction and reception of new members at General Meetings. In future new members will be asked to notify the Secretary beforehand of the date of the General Meeting at which they desire to be introduced and a printed postcard will be sent to each newly elected member for this purpose. They will be asked to take their seats on arrival in a special row of seats reserved and marked for them. At the beginning of the meeting, on the invitation being given to present themselves for formal admission, each new member will be led up to the Chairman by one supporter, and the Chairman will formally admit him to membership.

The introduction and reception of new members will take place at any of the forthcoming Ordinary General Meetings of the Royal Institute with the exception of the meetings on the following dates:—

23 January 1939 (Presentation of Prizes).

3 April 1939 (Presentation of Royal Gold Medal).

CHRISTMAS HOLIDAY LECTURES TO BOYS AND GIRLS

The twelfth series of informal talks on architecture to boys and girls will be given at the R.I.B.A. during the forthcoming Christmas holidays.

At the invitation of the Council, Mr. R. A. Duncan [A.] has kindly consented to give the talks this year. They will be illustrated by lantern slides, and Mr. Duncan has chosen as his subject:—

BUILDING BUILDINGS

Materials and Craftsmen.

Machines and Tools.

Design and Designers.

1. In Roman Times—A.D. 1 to 400.
2. In the Middle Ages—A.D. 400 to 1600.
3. In Modern Times—A.D. 1600 to 1938.

These lectures will form a serial story and give an outline of the wherefore and how of building from Roman to modern times. They will show the relationship between methods, materials and designs—how difficulties were overcome and problems solved—and in designs the objectives and the achievements.

The lectures will be given in the Henry Jarvis Memorial Room, in the R.I.B.A. building at 66 Portland Place, W.1, on the following dates:—

Wednesday, 28 December 1938, at 3.30 p.m.

Friday, 30 December 1938, at 3.30 p.m.

Monday, 2 January 1939, at 3.30 p.m.

Tickets for any or all of the lectures may be obtained from the Secretary of the Royal Institute of British Architects, 66 Portland Place, London, W.1. The tickets are free.

Owing to the limited seating space of the hall, it is hoped that application will not be made for more tickets than can be used.

R.I.B.A. ANNUAL DINNER 1939

The Annual Dinner will take place on Friday, 10 February 1939, at 7 for 7.30 p.m. in the R.I.B.A. Henry Florence Hall, 66 Portland Place, W.1. Full particulars are contained in the circular letter to members enclosed with this issue of the JOURNAL.

BRITISH ARCHITECTS CONFERENCE, DUBLIN, 21-24 JUNE 1939

The Annual Conference next year of the Royal Institute of British Architects and its Allied and Associated Societies will be held in conjunction with the Centenary Celebration of the Royal Institute of the Architects of Ireland and will take place at Dublin from 21 to 24 June 1939.

The Royal Institute of the Architects of Ireland have in hand the preparation of a most attractive programme and particulars will be issued in due course.

PROFESSIONAL ADVERTISING

The attention of the Practice Committee has been drawn to the fact that the publishers of certain journals are approaching architects for details of their professional activities, which the publishers propose to embody in the editorial columns of their journals. In the case of one particular firm of publishers, several members forwarded to the Institute the proposed article as drafted by the editor and sent to the architects for any additions or amendments the architects desire. In each case the wording of the articles is identical, with the exception of the names and addresses of the firms of architects to whom they were sent.

The Committee desire to warn members generally against this undesirable form of publicity. The acceptance by members of invitations of this nature from firms of publishers is, in the opinion of the Committee, directly contrary to the Code of Professional Practice and tantamount to advertising.

C

Competitions

The Council and Competitions Committee wish to remind members and members of Allied Societies that it is their duty to refuse to take part in competitions unless the conditions are in conformity with the R.I.B.A. Regulations for the Conduct of Architectural Competitions and have been approved by the Institute.

While, in the case of small limited private competitions, modifications of the R.I.B.A. Regulations may be approved, it is the duty of members who are asked to take part in a limited competition to notify the Secretary of the R.I.B.A. immediately, submitting particulars of the competition. This requirement now forms part of the Code of Professional Practice in which it is ruled that a formal invitation to two or more architects to prepare designs in competition for the same project is deemed a limited competition.

BEDWORTH, WARWICKSHIRE: NEW COUNCIL OFFICES

The Bedworth Urban District Council invite registered architects whose offices are situated in Warwickshire to submit in competition designs for new Council Offices to be erected on a site fronting High Street, Bedworth.

Assessor: Mr. S. N. Cooke [F.].

Premiums: £50, £25 and £15.

Last day for submitting designs: 31 January 1939.

Last day for questions: 31 October 1938.

Conditions of the competition may be obtained on application to Mr. Maurice Armson, Clerk of the Council, Council Offices, Bedworth, near Nuneaton. Deposit £1 1s.

COSELEY, STAFFS: NEW SCHOOL

The Coseley Education Committee invite registered architects whose addresses are in the area of the Birmingham and Five Counties Architectural Association to submit in competition designs for a new Public Elementary Junior and Infants School to be erected at Lanesfield.

Assessor: Mr. A. C. Bunch [F.].

Premiums: £100, £50 and £20.

Last day for submitting designs: 7 January 1939.

Last day for questions: 19 November 1938.

Conditions of the competition may be obtained on application to Mr. Fred J. C. Poole, Secretary for Education, Education Offices, Somerset House, Coseley, nr. Bilston. Deposit £3 3s.

GODALMING: NEW MUNICIPAL BUILDINGS

The Godalming Borough Council invite architects of British nationality to submit in competition designs for new Municipal Offices.

Assessor: Mr. Stanley C. Ramsey [F.].

Premiums: £200, £150 and £100.

Last day for submitting designs: 31 January 1939.

Last day for questions: 31 October 1938.

Conditions of the competition may be obtained on application to Mr. A. P. V. Moon, Town Clerk, Town Clerk's Office, Godalming. Deposit £1 is.

HUTTON, NEAR PRESTON, LANCS: NEW POLICE HEADQUARTERS

The Lancashire Standing Joint Committee for Police and other purposes invite chartered and/or registered architects to submit in competition designs for a new General Police Headquarters and Training School to be erected at Hutton, near Preston.

Assessor: Sir Percy Worthington, Litt.D., F.S.A. [F.].

Premiums: £500, £400 and £300.

Conditions of the competition were obtainable on application before 5 December 1938 to Sir George Etherton, Clerk of the Peace, County Hall, Preston. Deposit, £3 3s.

NEWCASTLE-UPON-TYNE: NEW TOWN HALL

The Council of the City and County of Newcastle-upon-Tyne invite architects of British nationality to submit in competition designs for a new Town Hall.

Assessor: Mr. Verner O. Rees [F.].

Premiums: £750, £500 and £300.

The last day for submitting designs has been extended to 31 December 1938.

Last day for questions: 6 July 1938.

ST. GEORGE'S HOSPITAL: RECONSTRUCTION

The President, Vice-President, Treasurer and Governors of St. George's Hospital invite architects practising in the United Kingdom and Northern Ireland to submit in competition designs for the reconstruction of St. George's Hospital, Hyde Park Corner.

Assessors: Dr. H. V. Lanchester [F.].

Mr. T. A. Lodge [F.].

Premiums: £500, £300 and £200.

The last day for submitting designs has been extended to 14 January 1939. Competitors are requested not to send in designs before 15 December 1938.

Last day for questions: 1 March 1938.

Conditions of the competition may be obtained on application to The House Governor, St. George's Hospital, Hyde Park Corner, London, S.W.1. Deposit £2 2s.

SHREWSBURY: NEW SENIOR SCHOOL

The Corporation of Shrewsbury invite architects to submit in competition designs for a new Senior School to be erected at Broom Hall, Ellesmere Road, Shrewsbury.

Assessor: Mr. C. Cowles-Voysey [F.].

Premiums: £200, £150 and £100.

The last day for submitting designs has been extended to 30 January 1939.

Last day for questions: 10 September 1938.

Conditions of the competition may be obtained on application to Mr. R. F. Prideaux, Town Clerk, Guildhall, Shrewsbury. Deposit £1 is.

FORTHCOMING COMPETITIONS

Other competitions which it is proposed to hold, and the conditions for which are not yet available, are as follows:—

BRIGHOUSE: NEW MUNICIPAL BUILDINGS

Assessor: Mr. James R. Adamson [F.].

EDMONTON: NEW TOWN HALL BUILDINGS

Assessor: Mr. E. Berry Webber [A.].

METROPOLITAN EAR, NOSE AND THROAT HOSPITAL: RECONSTRUCTION

Assessors: Messrs. Charles Holden [F.] and Lionel G. Pearson [F.].

OLDHAM: ELECTRICITY OFFICES AND DEPARTMENTAL BUILDINGS

Assessor: Professor R. A. Cordingley [F.].

WREXHAM: NEW TOWN HALL

Assessor: Mr. Herbert J. Rowse [F.].

LAGOS, NIGERIA: SUPREME COURT HOUSE

Assessor: Mr. A. F. B. Anderson [F.].

MEMBERS' COLUMN

Owing to limitation of space, notices in this column are restricted to changes of address, partnerships vacant or wanted, practices for sale or wanted, office accommodation, and appointments vacant. Members are reminded that a column in the Advertisement Section of the Journal is reserved for the advertisements of members seeking appointments in architects' offices. No charge is made for such insertions and the privilege is confined to members who are definitely unemployed.

PRACTICE FOR SALE

PRACTICE for Sale in fashionable seaside town, speedily developing and adjoining large garrison town in East of England; good connections and work in hand with promise of two large contracts in New Year; modernly equipped offices in centre of town. Replies in strict confidence.—Box 2911, c/o Secretary R.I.B.A.

PARTNERSHIPS WANTED

ASSOCIATE with considerable varied experience in provincial offices seeks partnership or position with view to partnership with well-established firm, preferably on outskirts of London; age 30; capital available. Replies will be treated in confidence.—Box 3011 c/o Secretary R.I.B.A.

ASSOCIATE (40), with established practice in London, wishes to enter into partnership with London firm. Capital available. Box 2811, c/o Secretary R.I.B.A.

ASSOCIATE, 28, with six years' architectural experience, ability in office organisation, and good knowledge of materials, requires progressive position with a view to partnership. London preferred. Capital available and useful contacts.—Reply Box 1398, c/o Secretary R.I.B.A.

DISSOLUTION OF PARTNERSHIP AND NEW PARTNERSHIP

THE partnership between J. A. Hoogterp [F.] and L. G. Jackson [L.] has now been dissolved, and L. G. Jackson has taken into partnership E. May, Stadtbaurat a.D., and the future style of the firm will be "Jackson & May," the practice being continued at "Corner House," Nairobi, Kenya Colony.

SENIOR AND JUNIOR DRAUGHTSMEN WANTED

SENIOR DRAUGHTSMAN required at once in busy Midland office, for Schools, Banks, Housing schemes and general practice. Applicants state age, qualifications and salary required, with reference, to Sandy & Norris, 134 Newport Road, Stafford.

JUNIOR DRAUGHTSMAN required at once in busy Midland office. Excellent prospects for capable and willing man. Applicants state age, qualifications and salary required, with reference, to Sandy & Norris, 134 Newport Road, Stafford.

ASSISTANCE OFFERED

F.R.I.B.A. with extensive experience would like to join an architect (or firm of architects) in London. Expert supervision and management of work and draughtsmanship if required. Arrangements to be made as to share of own practice.—Apply Box 1411, c/o Secretary R.I.B.A.

CHANGE OF ADDRESS

MESSRS. W. H. LANCASHIRE & SON have removed their offices to Sainsbury's Buildings, 54, Campo Lane, Sheffield. Telephone No. : 20709, as before.

TRADE CATALOGUES WANTED

MR. HENRY TATHAM, M.C. [A.], has opened offices at Marshall House, Newcomen Street, London Bridge, S.E.1—Tel. No. : Hop 1129—and would be glad to receive trade catalogues.

OFFICE ACCOMMODATION TO LET

ATTRACTIVE suite of very light well fitted offices in Southampton Street, Bloomsbury Square, W.C.1. Two large drawing offices, private room, hall, and accommodation for secretary. Immediate occupation. Furnished or unfurnished. Moderate rent on yearly tenancy or longer.—Apply Box 2311, c/o Secretary R.I.B.A.

A SMALL office is vacant in the Temple; facing south, with large cupboard accommodation in addition. Rent £35 p.a.—Apply Box 9118, c/o Secretary R.I.B.A.

FELLOW with offices in central position West End (London) offers facilities to provincial architect for correspondence, interviews, 'phone, etc., on moderate terms.—Box 5118, c/o Secretary R.I.B.A.

ASSOCIATE with suite of two rooms on first floor of office building in High Holborn would like young member to share same. Rent £35 per annum inclusive.—Apply Box 2808, c/o Secretary R.I.B.A.

MINUTES II

SESSION 1938-1939

At the Second General Meeting of the Session 1938-1939, held on Monday, 21 November 1938, at 8 p.m., Mr. H. S. Goodhart-Rendel, President, in the chair.

The meeting was attended by about 170 members and guests.

The minutes of the inaugural general meeting held on 7 November 1938 were taken as read, confirmed and signed as correct.

The Hon. Secretary announced the decease of:—

Frederick Landseer Maur Griggs, R.A., F.S.A., elected Hon. Associate 1926.

Herbert Harold Brown, elected Licentiate 1910, Fellow 1913,

Sir John James Burnet, R.A., R.S.A., Hon. LL.D. Glasgow, elected Associate 1881, Fellow 1897. Sir John Burnet was Royal Gold Medallist for 1923 and—in conjunction with his partners—London Architecture Bronze Medallist in 1932 and 1934. He was also a Past President of the Glasgow Institute of Architects, a member of the Comité Permanent Internationale des Architectes and the Franco-British Union of Architects; served for many years on the R.I.B.A. Council, being a Vice-President from 1915 to 1919, and on the many Committees and Boards.

Grahame Cotman, elected Licentiate 1911, Fellow 1925.

David McLeod Craik, elected Associate 1900, Fellow 1914.

George Herbert Godsell, elected Fellow 1926. Mr. Godsell was President of the Institute of Architects of New South Wales from 1921 to 1923 and represented that body on the Allied Societies Conference.

Edward Lewis Harrison, elected Licentiate 1911, Fellow 1918.

John Henry Harvey, elected Licentiate 1912, Fellow 1937.

James Herbert Heywood, elected Licentiate 1911, Fellow 1925.

Thomas Houston, elected Fellow 1934. Mr. Houston was President of the Royal Society of Ulster Architects in 1934-35.

George Churchus Lawrence, R.W.A., elected Associate 1896, Fellow 1924. Mr. Lawrence was a Vice-President in 1928-29, a Past President of the Wessex Society of Architects and the Bristol Society of Architects, a member for several years of the R.I.B.A. Council and the Allied Societies Conference, being Chairman from 1929 to 1931, and a member of many R.I.B.A. Committees and Boards.

David Ivor Lewis, transferred to Fellowship 1925.

Andrew Mather, transferred to Licentiateship 1925, elected Fellow 1934.

Percy William Meredith, elected Associate 1897, Fellow 1907.

Arthur Forman Balfour Paul, M.C., elected Licentiate 1911, Fellow 1933. Mr. Paul was President of the Edinburgh Architectural Association and representative on the R.I.B.A. Council and Allied Societies Conference from 1934 to 1936.

Langé Leopold Powell, elected Fellow 1929. Mr. Powell was a Past President of the Royal Australian Institute of Architects and the Queensland Institute of Architects, and a representative on the Allied Societies Conference in 1928-29 and 1933-34.

Alfred Every Powles, J.P., elected Fellow 1905.

David Smith, elected Licentiate 1911, Fellow 1935. Mr. Smith was Tite Prizeman for 1903.

Sydney Tugwell, elected Associate 1911, Fellow 1919.

Frederick John Wills, transferred to Fellowship 1925.

William Eaton, elected Associate 1890, Fellow 1929, transferred to Retired Fellowship 1930.

Francis George Fielder Hooper, elected Associate 1882, Fellow 1897, transferred to Retired Fellowship 1932. Mr. Hooper was Pugin Student for 1882 and Godwin Bursar for 1888. He served on many R.I.B.A. Committees.

Harry Chambers Kent, elected Fellow 1905, transferred to Retired Fellowship 1934.

Frank Lishman, elected Associate 1894, Fellow 1912, transferred to Retired Fellowship 1935.

Arthur Edmund Street, elected Associate 1881, Fellow 1891, transferred to Retired Fellowship 1924.

Edward Lawrence Gaunt, elected Associate 1902.

William James Geddes, elected Associate 1935.

Wilfred Lethaby Haile, elected Associate 1923.

Joseph Fearis Munnings, elected Associate 1910.

George Edward Potterton, elected Associate 1932.

Frederick Sale, elected Associate 1920.

Alfred Dennis Thacker, elected Associate 1907.

Ernest William Bostock, transferred to Licentiateship 1925.

William Frederick Edwards, elected Licentiate 1910.

Sir Herbert Henry Humphries, C.B.E., transferred to Licentiate-ship 1925.

Gilbert McGarva, elected Licentiate 1911.

Money Marsland, elected Licentiate 1911.

William John Waterman Roome, transferred to Licentiate-ship 1925.

David Edgar Turner, elected Licentiate 1932.

And it was resolved that the regrets of the Institute for their loss be entered on the minutes and that a message of sympathy and condolence be conveyed to their relatives.

The following members attending for the first time since their election were formally admitted by the President :—

<i>Fellow</i>	
W. B. Wheatley	
<i>Associates</i>	
Donald L. Blair	T. James Hirst
E. Bubb	Frank S. Hodge
<i>Licentiates</i>	
A. H. Mack	S. Wesley Harris
W. G. Clarke	Leonard S. Jones
Douglas L. K. Dick	J. S. Tipper

Mr. Oliver W. Roskill, having read a Paper on "Economics of the Building Industry—Achievements and Anomalies," a discussion ensued, and on the motion of Sir Jonah Walker-Smith, M.P. [*Hon. A.J.*], Director of the National Federation of Building Trades Employers, seconded by Dr. Brinley Thomas, M.A., Lecturer, Economics Department, London School of Economics, a vote of thanks was passed to Mr. Roskill by acclamation and was briefly responded to.

The proceedings closed at 10.10 p.m.

MINUTES III

SESSION 1938-1939

At a Special General Meeting held on Monday, 21 November 1938, at the conclusion of the Second General Meeting of the Session.

Mr. H. S. Goodhart-Rendel, President, in the chair.

The meeting was attended by 12 Fellows, 30 Associates and 8 Licentiates.

The President announced that the Special General Meeting had been called for the purpose of considering and, if thought fit, of passing the following resolution :—

"That the Council be authorised to raise by way of loan from the Prudential Assurance Company, Ltd., secured by registered charge upon the Institute's properties Nos. 66 and 68 Portland Place, London, W.1, such sum upon such terms as to interest and capital repayment as have been agreed between the Council and the Prudential Assurance Company, Ltd."

The resolution having been moved by the President and seconded by Mr. W. H. Ansell, Hon. Secretary, was put to the vote of the meeting and was passed unanimously.

The proceedings closed at 10.18 p.m.

Architects' and Surveyors' Approved Society

ARCHITECTS' ASSISTANTS' INSURANCE FOR THE
NATIONAL HEALTH AND PENSIONS ACTS

Architects' Assistants are advised to apply for the prospectus of the Architects' and Surveyors' Approved Society, which may be obtained from the Secretary of the Society, 113 High Holborn, London, W.C.1.

The Society deals with questions of insurability for the National Health and Pensions Acts (for England) under which, in general, those employed at remuneration not exceeding £250 per annum are compulsorily insurable.

In addition to the usual sickness, disablement and maternity benefits, the Society makes grants towards the cost of dental or optical treatment (including provision of spectacles).

No membership fee is payable beyond the normal Health and Pensions Insurance contribution.

The R.I.B.A. has representatives on the Committee of Management, and insured Assistants joining the Society can rely on prompt and sympathetic settlement of claims.

Architects' Benevolent Society

66 PORTLAND PLACE, W.1
FOUNDED 1850

The object of the Society is to afford assistance to architects, architects' assistants, and their widows and children by means of grants and pensions.

Subscriptions and donations of any amount are urgently needed. An annual subscriber of £1 is. is entitled to recommend annually two applicants for relief.

A.B.S. INSURANCE DEPARTMENT

PENSION AND FAMILY PROVISION SCHEME FOR ARCHITECTS

This scheme has been specially designed by the A.B.S. Insurance Committee for members of the R.I.B.A. and its Allied and Associated Societies. It provides :—

1. A pension for members on retirement at age 65.
2. Widows' pension—payable to the widow from the time when, if the member had lived, he would have attained age 65.
3. Family protection—if the member dies before age 65 a yearly payment is made to his dependants from the date of his death till Benefit No. 2 becomes available.

The benefits may be purchased in units of £50 per annum up to a maximum of £500 per annum.

Please write for full particulars to the Secretary, A.B.S. Insurance Department, 66 Portland Place, London, W.1. Telephone : Welbeck 5721.

It is desired to point out that the opinions of writers of articles and letters which appear in the R.I.B.A. JOURNAL must be taken as the individual opinions of their authors and not as representative expressions of the Institute.

Members sending remittances by postal order for subscriptions of Institute publications are warned of the necessity of complying with Post Office Regulations with regard to this method of payment. Postal orders should be made payable to the Secretary R.I.B.A. and crossed.

Members wishing to contribute notices or correspondence must send them addressed to the Editor not later than the Tuesday prior to the date of publication.

Back numbers of the JOURNAL can be obtained at the price of 1s. 6d., including postage throughout the world. For orders of more than six copies discounts are given. Orders must be prepaid.

R.I.B.A. JOURNAL

DATES OF PUBLICATION.—1938.—19 December. 1939.—9, 23 January; 6, 20 February; 6, 20 March; 3, 24 April; 8, 22 May; 12, 26 June; 17 July; 14 August; 18 September; 16 October.



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VOLUME 1

BUILDING SCIENCE

QUESTIONS *and* ANSWERSNOTES FROM THE INFORMATION BUREAU OF
THE BUILDING RESEARCH STATION*

(4th Series, No. 5)

From time to time there have been included in these Notes discussions of selected topics not necessarily related to specific questions addressed to the Station, but rather a reflection of a body of inquiries submitted. There are a number of such topics which it is thought could usefully be discussed in that way, and it has therefore been decided that for a period of twelve months or so these Notes shall take the form essentially of such discussions. It is not intended, however, to adhere rigidly to this form, for any inquiries of special interest that may be received by the Station during the period will be dealt with as before.

DIRECTOR OF BUILDING RESEARCH.

THE THERMAL INSULATION OF BUILDINGS
PART I—GENERAL PRINCIPLES

The following note is a summary of available knowledge—the treatment is not exhaustive. It is presented in the hope that it may be found useful as a convenient résumé of existing information.

INTRODUCTION

In all cases where the interior of a building has to be maintained at a temperature different from that of the outside air, the degree of insulation afforded by the structure is of primary importance in determining the heating or cooling load: the equipment provided for heating or cooling the building must be carefully considered in relation to this factor. Under the climatic conditions prevailing in this country problems of thermal insulation most commonly arise in connection with the heating of buildings in winter. Recent advances in the technique of air-conditioning and the cold-storage of foodstuffs, however, are bringing into prominence the converse case of rooms maintained colder than their surroundings. Whatever the direction of heat leakage the problem must be regarded as one of a balance of costs, for by paying adequate attention to the question of insulation, considerable savings in heating or cooling costs can frequently be effected. In every case the increase in the cost of the building entailed by providing additional thermal insulation must be weighed against the anticipated economies in fuel or power. There is always an optimum condition beyond which it is uneconomic to go.

The object of the present note is to give in brief outline the general principles involved in any problem of thermal insulation. To avoid any confusion it is assumed that the leakage of heat to be considered is between two bodies of air at different temperatures with the structure intervening. This excludes the special case of heating by sunshine. Insulation against radiant solar heat may with advantage follow quite different principles, and will form the subject of a separate note.

Apart from any saving which may result from the "correct" thermal insulation of a building, it is frequently possible by the same means to minimise trouble due to condensation. In a poorly insulated building cold outside conditions cause serious cooling of the internal surfaces of the shell, which may result in the deposition of atmospheric moisture on these surfaces by the process of condensation. Better thermal insulation of the structure lessens the surface cooling and can in many cases prevent condensation. Other advantages arising from the correct use of thermal insulation are to be found in the reduction of thermal movements in buildings, the lessening of pattern staining and, for a given supply or extraction of heat, the shortening of the time required for the heating or cooling of a building.

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It should be emphasised at the outset that the property of thermal insulation is not confined to a particular group of building materials. All the materials employed in building afford some degree of thermal insulation, although it is usual to class as "thermal insulating materials" those which are used specifically to increase the thermal insulation of a building the structure of which is determined by other factors. The structure of a building which is designed solely to meet the requirements of stability, rain exclusion, etc., will thus, incidentally, provide *some* thermal insulation.

UNIT OF MEASUREMENT

The thermal insulation value of a structure is measured by the amount of heat which will pass from the air on one side, to the air on the other side of the structure. In the units commonly employed in building, this heat is measured by the number of British Thermal Units which will pass under steady conditions in one hour across an area of one square foot in a direction perpendicular to the area, when the difference in temperature between the air on one side and the air on the other side of the structure is one degree Fahrenheit. This value is known as the "*air-to-air thermal transmission coefficient*".

In order to obtain a figure for the air-to-air thermal transmission coefficient of a structure, it is necessary to know the thermal conductivities of the materials which make up the structure and also something of the environmental conditions on both sides of the structure. Before the method is discussed by which the air-to-air thermal transmission coefficient of a structure can be obtained, it is necessary to understand clearly what is meant by the terms "thermal conductivity", "thermal conductance", "thermal resistivity", "thermal resistance", "surface resistance", and "air-to-air resistance", and the relationship which exists between these terms and the term "air-to-air thermal transmission coefficient" referred to above. Confusion between the above-mentioned terms is a common cause of error and misunderstanding whenever this subject is discussed. It is important that whenever figures for any of these terms are used, their significance should be kept clearly in mind.

Thermal Conductivity

The thermal insulation values of building materials are commonly expressed as "thermal conductivities". The "*thermal conductivity*" of a homogeneous material may be defined as the

rate of heat passing under steady conditions, per unit area, and per unit temperature gradient, in a direction perpendicular to the area. In the case of building materials, thermal conductivity is expressed as the number of British Thermal Units passing per hour across an area of one square foot, when the difference between the surface temperatures is one degree Fahrenheit per inch of thickness.

Thermal conductivity, it should be noted, varies only as between one material and another material.

Thermal Conductance

The term "*thermal conductance*" takes into consideration the *thickness* of the material or structure. For a homogeneous material, the thermal conductance varies inversely with the thickness. On the same standards as used in measuring thermal conductivity, thermal conductance is the number of British Thermal Units passing per hour across an area of one square foot of the material or structure (which may be of any thickness) when the surface temperatures differ by one degree Fahrenheit.

In order to understand the difference between "thermal conductivity" and "thermal conductance" the example of a window glazed with, say, 26 oz. glass may be considered. Glass, considered as a material and compared with say, a metal, has a *low* thermal conductivity: glazing, however, considered as a structure which is only $\frac{1}{4}$ in. thick, has a *high* thermal conductance compared with, say, a brick structure which is 14 in. thick.

For practical purposes it is convenient to work, not in terms of thermal conductivities and conductances, but in reciprocals of these units—the "thermal resistivities" and "thermal resistances".

Thermal Resistivity

The "*thermal resistivity*", or more commonly, the "*resistance per unit thickness*", of a material may be defined, in the same units used in the case of thermal conductivity and conductance, as the number of hours required for the transmission of one British Thermal Unit per square foot, when the difference between the surface temperatures is one degree Fahrenheit per inch of thickness.

Thermal Resistance

The "*thermal resistance*" of a material or structure is the number of hours required for the transmission of one British Thermal Unit per

square foot of the material or structure (which may be of any thickness) when the surface temperatures differ by one degree Fahrenheit.

The advantages of dealing in terms of resistivities and resistances instead of conductivities and conductances are, firstly, that the resistance of a homogeneous material varies directly as its thickness and can therefore be readily calculated from a value per unit thickness, and, secondly, that the total resistance of a composite structure can be obtained by direct addition of the resistances of the component layers.

Surface Resistance

While the total resistance of a structure is of great importance in determining the rate of flow of heat from warm air on one side to cooler air on the other, it is not the only factor. At the one side of the structure heat has to be transferred from the air to the surface of the structure and at the other from the surface of the structure to the air. In each of these transfers there is a certain resistance, which must be added to the resistance of the structure. The value of these resistances varies with the environmental conditions and is lower when air moves rapidly across the surface. It is worth noting that the heat flow through thin membranes of high conductance, such as glass, or some of the sheeting materials used in roofing, is almost entirely controlled by the surface effects.

Average values for the surface resistance of the walls of a building under normal conditions in this country are 0.75 hr./B.Th.U./sq.ft./°F. for internal surfaces and 0.25 hr. for external surfaces, but very different values may be found under exceptional conditions of exposure.

Air-to-Air Resistance

The sum of the resistances of the component layers of a structure and the surface resistances on each side of the structure, will give the "air-to-air resistance" of the structure.

Air-to-Air Thermal Transmission Coefficient

The reciprocal of the air-to-air resistance of a structure will give the "air-to-air thermal transmission coefficient" of the structure.

EXAMPLE OF METHOD OF CALCULATION OF AIR-TO-AIR TRANSMISSION COEFFICIENT

On the basis of the above-mentioned figures for

the surface resistances, and taking the conductivity of the bricks and plaster to be 6.67 and 3.33 B.Th.U./hr./in./sq.ft./°F., respectively, the air-to-air thermal transmission coefficient for a wall of a building constructed of 9 in. solid fletton brickwork with $\frac{3}{4}$ in. plaster on the inside, would be:—

Brick

Conductivity 6.67 B.Th.U./hr./in./sq.ft./°F.

Resistivity $\frac{1}{6.67} = 0.15$ hr./B.Th.U./in./sq.ft./°F.

Resistance of a wall $0.15 \times 9 = 1.35$ hr./B.Th.U./sq.ft./°F. 9 in. thick.

Plaster

Conductivity 3.33 B.Th.U./hr./in./sq.ft./°F.

Resistivity $\frac{1}{3.33} = 0.3$ hr./B.Th.U./in./sq.ft./°F.

Resistance of $\frac{3}{4}$ in. $0.3 \times \frac{3}{4} = 0.23$ hr./B.Th.U./sq.ft./°F. thick plaster.

Adding the individual resistances will therefore give:—

Internal surface	
resistance	0.75 hr./B.Th.U./sq.ft./°F.
Resistance of $\frac{3}{4}$ in.	
plaster	0.23 "
Resistance of 9 in.	
brick	1.35 "
External surface	
resistance	0.25 "
Air-to-air resistance	2.58

or an air-to-air thermal transmission coefficient of:—

$\frac{1}{2.58} = 0.39$ B.Th.U./hr./sq.ft./°F. difference of air temperature.

The last stage of this calculation can be performed graphically by the use of a specially prepared alignment chart such as is shown in Figure 1. In this chart provision is made for varying conditions of exposure.

In using it, a straight edge is laid across joining a point representing the thermal resistance of the construction alone, on the left-hand scale, with the appropriate exposure for the worst conditions on the right-hand scale. The air-to-air thermal transmission coefficient is read off on the middle scale.

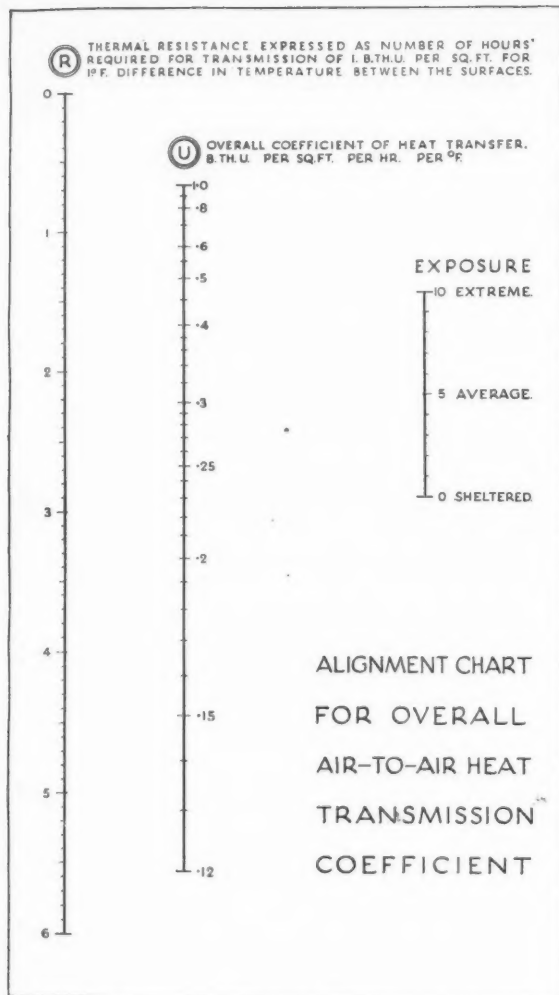


Figure 1.

INSULATION VALUES FOR REPRESENTATIVE MATERIALS

Figure 2 illustrates in graphical form the relative thermal insulating values for various building materials for unit thickness and also of specific thicknesses of these materials. The values indicated are thermal resistances derived as described above from laboratory measurements of thermal conductivity and conductance.

EFFECT OF AIR CAVITIES

No account is taken in Figure 2 of the effect of air cavities. An air space, particularly when it is sealed, provides one of the best ways of obtaining thermal insulation. It is omitted from the list, however, because the efficiency of an air space varies considerably depending on its situation and surroundings—the only safe way is to consider each case separately. For instance, the thermal resistivity of a 2 in. air space with metal wall ties in a cavity wall is 0.20 hr./B.Th.U./sq.ft./°F. per inch thickness. This is much lower than the thermal resistivity of an air space between a wall and an interior lining which, when the lining is on wood studs and the air space is of a normal thickness, can be taken as 0.90 hr./B.Th.U./sq.ft./°F. per inch thickness.

It should be realised that the thermal insulation value of a structure may be much less when it is wet than when it is dry. The figures given in Figure 2 are for dry conditions unless otherwise stated.

THERMAL CAPACITY

An important property of materials which is closely allied to conductivity is "specific heat". The "specific heat" of a material may be defined as the amount of heat which is required to raise unit mass of the material through unit difference of temperature. The mass of a material multiplied by its specific heat will give its "thermal capacity". The sum of the thermal capacities of the materials which make up a structure, will give the thermal capacity of the structure. The lower the thermal capacity of a structure the more quickly will the temperature of the structure respond to fluctuations in the temperature of the environment while the higher the thermal capacity of the structure the slower will be the response. This fact should be made use of in the design of buildings. An example is furnished by a room which is required for occupation during mealtimes only. An interesting experiment was made in a house some years ago. A small room with brick walls finished with plaster in the usual way, was used for breakfast, and it was found necessary to turn on the gas fire one-and-a-half hours beforehand to warm the room sufficiently. The walls were subsequently panelled in wood, and the period required for heating-up was then reduced to half an hour. The curves in Figure 3 show rates of rise of

ROYAL INSTITUTE OF BRITISH ARCHITECTS

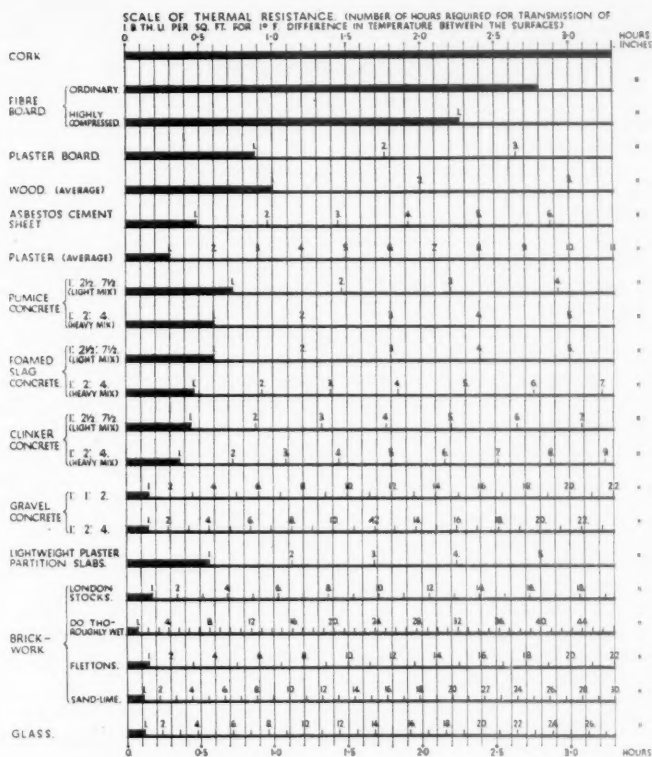


FIGURE 2. THERMAL RESISTANCES. THE LENGTHS OF THE THICK BLACK LINES ARE PROPORTIONAL TO THE THERMAL RESISTANCES OF UNIT THICKNESSES OF VARIOUS MATERIALS. ANY VERTICAL LINE DRAWN THROUGH THE FIGURE INDICATES THE THICKNESSES OF MATERIAL NECESSARY TO GIVE EQUAL INSULATION.

temperature actually recorded before and after panelling. This result was achieved because the new lining was of lower thermal capacity and better thermal insulation than the bare wall. This is a case in which thermal insulation results in a distinct convenience by saving time as well as fuel costs.

(The thermal insulation values of certain common constructions, together with recommendations for the type of construction which should be adopted to provide good thermal insulation, will follow in Part II of this note.)

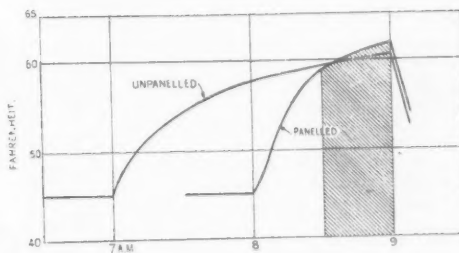


Figure 3. ROOM USED FOR HALF AN HOUR.

THE THERMAL INSULATION OF BUILDINGS

PART II—PRACTICE

In Part I of the Note reference was made to the importance of thermal insulation, not only from the point of view of preventing undue heat loss, but also in avoiding condensation, pattern staining and cracking due to thermal movements.

The question arises: How much insulation is needed to meet these different requirements? Data on the subject are not as complete and precise as they might be. Doubtless this is largely due to the fact that though increasing attention is now being given to insulation problems, it has not been the practice to consider the provision of insulation in that degree of detail. Broadly speaking, it might almost be said that the practice has been to take it for granted that a building which satisfies the fundamental requirements of strength and stability, rain exclusion, etc., will automatically satisfy insulation requirements to a sufficient degree. It is desirable, however, that the question put above should be faced.

The subject is therefore discussed, in the light of available data and experience, in the following paragraphs and suggestions made as to the requirements. It will be appreciated that space will not permit more than an indication of general considerations coupled here and there with some illustrative example. It would go outside the scope of the present note to discuss at any length the relative merits of different materials and forms of insulating construction.

Before proceeding to consider the separate requirements, starting with those of the avoidance of thermal movement, it may be noted that the requirements for the different purposes are not necessarily additive.

THE REDUCTION OF THERMAL MOVEMENT

Thermal movement in a building sufficient to cause damage is usually due to solar radiation. Consequently, roofs are more liable to it than walls. A flat roof, for example, is more nearly normal to the sun's rays when they are most powerful than any other part of the structure. However, it is only extensive and continuous roofs such as large areas of monolithic concrete with which the thermal movement is likely to be sufficient to cause damage and for which therefore protection is required.

Protection can be provided by the use of a layer of material of high, or relatively high, thermal resistivity. Obviously, to be effective it must be

placed outside the main roof structure. Available materials of high resistivity, e.g. cork-board, fibre-board, cannot in general be placed right on the outside of the roof since usually they require to be protected from dampness, which reduces both their life and their efficiency as thermal insulators. In terms of the familiar example of the concrete flat roof with its necessary waterproof membrane of, say, asphalt mastic, this means that the cork or other material should be placed immediately under the asphalt. Materials such as gravel, concrete paving tiles which are not affected by dampness and which, therefore, can be placed on the outer surface usually have a low resistivity and, therefore, require to be provided in relatively thick layers. So far as such materials are concerned their thermal capacity matters more than their thermal resistance. The practical distinction between a layer of high capacity and one of high resistance is that the layer of higher capacity takes a longer time to heat up and, therefore, helps to produce a sufficient time-lag to avoid the effects of the sun when it is at its hottest.

Any insulation provided to reduce thermal movement will, of course, add to the thermal insulation of the structure and help to reduce condensation, pattern staining, and heat loss, which are discussed later. In general, however, thermal insulation for these purposes is most advantageously placed on the *internal* face of the shell of the building. This would seem to imply providing an insulating layer both outside and inside, but actually the effect of the insulating layer on the outside can be achieved by some white surface treatment which will serve to *reflect* the sun's rays and prevent in that way the heating up of the fabric by solar radiation. For example, it has been found that a covering of whitewash on $\frac{3}{4}$ in. asphalt laid on a 4 in. concrete slab is as effective against *thermal movement* as a 2 in. thickness of cork under the asphalt. The protection afforded by a coating of whitewash represents, for practical purposes, the highest that can be obtained by reflection. The question arises whether this is enough. Very little precise information is available in this direction, but experience suggests that protection equivalent to that afforded by a highly reflective surface such as whitewash or 2 in. or even 1 in. of cork (which is only a little less effective than whitewash) should be sufficient in any structure which is less than 100 ft. in any direction. [In a previous note in this series, it was stated that the provision of insulation equivalent

to that of a white surface treatment is quite uneconomical. It has been pointed out, rightly, that this is not true in terms of whitewash and 1 in. of cork which for this purpose is nearly as effective as 2 in., when the cost of periodical renewal of whitewash is balanced against the initial cost of the cork. There are other factors which might enter in deciding between a white surface treatment and an insulating layer in particular cases, though they are probably not of sufficient importance to warrant any qualification, for general purposes, of the broad statement as to the practical equivalence, as regards performance, of whitewash and a cork layer 2 in. or even 1 in. thick.]

Where a greater margin of safety is required than that given by whitewash or the cork, or where a dimension of the structure exceeds 100 ft., both forms of insulation might be combined, by the use of a light-coloured surface in conjunction with cork-board or fibre-board. In very large buildings even this protection will probably not suffice; in this case it will be necessary to divide the building into areas of moderate size by suitably designed expansion joints.

THE REDUCTION OF CONDENSATION

(1) *Windows*

Because of the high conductance of glass it is impossible to prevent condensation from occurring on single glazed windows unless special steps are taken by suitable heating and ventilation. With double glazing, the position would be different in view of the extra thermal insulation thus provided. Double glazing, however, is rarely considered justified from the point of view of the reduction of condensation alone, since windows, unlike the rest of the interior surfaces of a building, are unharmed by condensation.

(2) *Walls, Ceilings, etc.*

Condensation on the remaining internal surfaces of a building cannot however be ignored, particularly as regards walls and ceilings, since the decoration usual on these surfaces is easily harmed by dampness.

Condensation occurs on a wall or other surface when the heat loss to it is sufficient to lower the temperature of the air in contact with it below the dew point. This heat loss can be reduced, with a corresponding reduction in the risk of condensation, by thermal insulation. The nearer this thermal insulation is placed to the inner surface, the less will be the risk of condensation in the building for if it is set back, the thermal capacity of that part of the wall which lies between the insulation and the inner surface may be such that

its response to fluctuations of temperature is so slow as again to bring a risk of condensation.

Some condensation at times is, of course, almost inevitable where efficient heating and ventilation is not provided, but even where the heating and ventilation is good, it would appear that an amount of thermal insulation at least equal to that provided by an 11 in. sealed cavity wall,* plastered internally, is usually necessary to prevent trouble due to condensation. Experience suggests that under the same conditions a solid wall by itself does not provide complete insurance against condensation either because of its high thermal conductance when it is not very thick, or its high thermal capacity when it is very thick.

For the improvement of the insulation provided by a solid wall it can be lined internally with a light-weight and insulating material, such as wood panelling or fibre-board, or with plaster on either laths or plaster-board, fixed to timber battens plugged to the wall. In addition to the insulation value of this lining, the air space between the battens and the wall face contributes markedly to the insulation value of the construction. An alternative method is to line the wall with, say, 1 in. of cork-board or fibre-board fixed directly to the wall face.

The experience of the Station in dealing with practical cases suggests that the provision of a wall having an air-to-air transmission coefficient of 0.3 B.Th.U./hr./sq.ft./°F. difference in air temperature is necessary to reduce risk of condensation to a reasonable level. This insulation is provided by an 11 in. cavity wall or a 9 in. solid wall lined in the above manner.

Similar thermal insulation should be adopted in the case of roofs. A well-built pitched roof with a ceiling beneath usually provides thermal insulation at least equal to that mentioned above. This, however, is rarely the case where a flat roof is concerned—especially where the roof is constructed of concrete. A roof of this nature should be lined on the underside in the same manner as described for walls.

THE REDUCTION OF PATTERN STAINING

Pattern staining is due to temperature differences over the surface of a non-homogeneous structure as the result of differences in the thermal conductivity of the parts of the structure. It can be prevented by introducing such an amount of

* *Note:* In Part I of the Note a value was given for the thermal resistance of a 2 in. air space in terms of "per inch of thickness". This was done for purposes of convenience and applies only to the thickness mentioned.

thermal insulation on the inside as will sufficiently reduce these temperature differences. The amount required and the manner in which it is applied will, of course, depend upon the circumstances of the case. Broadly speaking, it is probably true to say that the provision of insulation adequate to reduce condensation will largely obviate pattern staining.

Pattern staining and recommendations for the use of thermal insulation to prevent it, are dealt with at length in Building Research Bulletin No. 10—"The Prevention of Pattern Staining of Plasters" (London, 1931, H.M. Stationery Office, Price 4d. net).

THE REDUCTION OF HEAT LOSS

One of the objects of a building is to provide for comfortable temperature conditions inside irrespective of weather conditions outside, and this in the most economical manner possible. This means providing at the minimum of cost for coolness in summer and warmth in winter. In this country the latter is of course the principal concern. It remains therefore to consider the question of reducing heat losses through the structure.

It has already been noted, that any structure which is designed to satisfy the requirements of structural stability, rain exclusion, etc., must of necessity provide *some* thermal insulation; further, that in order to prevent or reduce condensation, pattern staining, and perhaps, thermal movement, the thermal insulation of the shell of a building must be of a certain standard.

The question of what extra insulation, if any, is introduced to reduce heat losses is largely a matter of balancing costs—the cost of the thermal insulation being weighed against the anticipated saving in heating costs. At first sight, since the cost of any extra thermal insulation is a non-recurring and usually not very high charge on the building, it would appear that a great increase in the thermal insulation of a building can easily be justified. Actually, however, added insulation to the walls, floors, etc., however great, would only go a certain way towards reducing heat losses. Calculation for a room which was by no means exceptional showed that the heat losses from the room on a particular day were as to 25 per cent represented by heat lost through the windows, as to 39 per cent by heat lost in warmed air leaving the room through the flue, etc., and replaced by cold air and only as to the remaining 36 per cent heat lost through the walls, floor and ceiling. It would, therefore, be irrational to push to an extreme extent the provision of insulation for the walls, etc. Attention should be paid to all three

causes of heat loss. Short of double glazing, there is of course a strict limit to what can be done in reducing heat losses through windows without unduly sacrificing daylighting. Similarly some loss of heat through the escape of warmed air must be faced in the interests of ventilation; but anything that is done to reduce discomfort from draughts will at the same time help to reduce heat losses. Further, air-infiltration through open joints in boarded ground floors with the usual ventilated air space underneath which is a common cause of unnecessary heat loss, can be prevented by the use of tongued and grooved boarding without sacrifice of necessary ventilation.

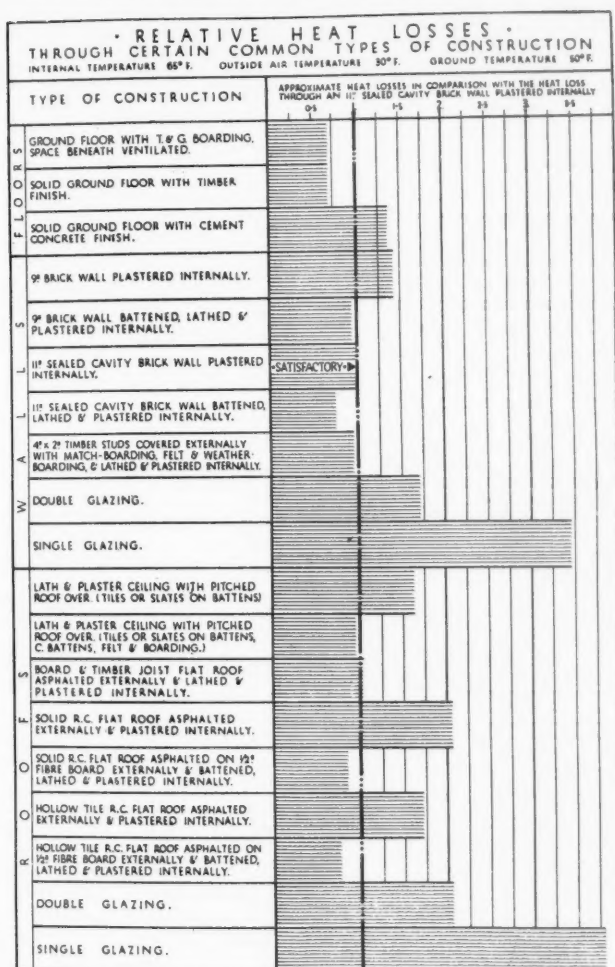
Due account should therefore be taken of inevitable heat losses through windows and escape of warmed air, in the interests respectively of daylighting and ventilation, in considering the extent of the insulation of the walls, etc., to reduce heat losses. It is in fact doubtful whether, in general, any thermal insulation over and above that required for the purpose of avoiding thermal movement, condensation and pattern staining, will usually be justified.

It should nevertheless be pointed out that insulation to prevent heat losses is not *entirely* a matter of balancing costs. Take the case of two rooms, one with thin walls and the other with thick. It might at first sight be supposed, that given a bigger fire, the first room could be made just as comfortable as the second. Actually this is not necessarily the case. The inner surface of the thin wall will be colder than that of the thick one, so that with the bigger fire, but colder wall, the temperature conditions will tend to be less uniform and less comfortable in the first room than in the second. Differences in conditions in practice, however, are not usually such as to make this point of serious importance though it is not one to be altogether ignored. There is, however, the point, mentioned in Part I, that the provision of an insulating layer on the inside of the walls does make a great difference to the *rate* at which the room can be warmed with a given source of heat—a point of especial importance in connection with intermittent heating.

In the following Figure the insulation value of certain common types of construction are compared with that of an 11 in. cavity wall plastered internally which, as indicated, is considered to provide a satisfactory standard of thermal insulation for ordinary purposes.

Further information on the thermal insulation of buildings will be found in "Principles of Modern Building, Volume I—Walls, Partitions and Chimneys" (London, 1938, H.M. Stationery Office, price 10s. 6d. net).

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